EPA/ROD/R04-90/069
1990

EPA Superfund
Record of Decision:

LEWISBURG DUMP
EPA ID: TND980729115
OU 01
LEWISBURG, TN
09/19/1990

Text:
SAWDUST, COLORED AND BLACK PENCIL CORES, COSMETIC POWDERS, SHOE LININGS, ADHESIVES, PAINT STRIPPER, EMPTY FIVE-GALLON PAILS COATED WITH YELLOW LACQUER, AND METAL CUTTINGS.

EPA NOTIFIED POTENTIALLY RESPONSIBLE PARTIES (PRPS) IN A LETTER DATED JANUARY 28, 1986, OF CONDITIONS AT LEWISBURG DUMP, AND OF EPA'S PLANS FOR AN INVESTIGATION OF THE CONTAMINATION. IN MAY 1987, THE CITY OF LEWISBURG AND LOCAL INDUSTRY FORMED THE LEWISBURG ENVIRONMENTAL RESPONSE COMMITTEE (LERC) TO NEGOTIATE WITH EPA FOR UNDERTAKING A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS). PHASE I ACTIVITIES OF THE REMEDIAL INVESTIGATION BEGAN IN OCTOBER OF 1988 AND THE RI AND FS REPORTS WERE COMPLETED IN JUNE AND JULY OF 1990, RESPECTIVELY.

THE FINDING OF THE RI CONFIRMED THE PRESENCE OF 32 ORGANIC AND 20 INORGANIC CONTAMINANTS AT THE SITE. OF THE 52 CONTAMINANTS, 21 HAVE BEEN FOUND TO BE OF "POTENTIAL CONCERN". FURTHER ANALYSIS REVEALED THAT A TOTAL OF 6 CONTAMINANTS ARE OF SIGNIFICANT CONCERN DUE TO FREQUENCY OF DETECTION OR QUANTITY.

#HCP
HIGHLIGHTS OF COMMUNITY PARTICIPATION

THE FIRST PUBLIC MEETING AT LEWISBURG WAS HELD IN AUGUST 11, 1988. THIS MEETING WAS HELD PRIMARILY TO PRESENT THE RI/FS WORKPLAN AND ANSWER QUESTIONS FROM THE COMMUNITY. THE SECOND PUBLIC MEETING TO PRESENT THE PROPOSED PLAN CONCERNING THE LEWISBURG DUMP SITE WAS HELD AT THE CITY ADMINISTRATION BUILDING IN LEWISBURG, TENNESSEE ON JULY 25, 1990. THE COMMUNITY RELATIONS PLAN (APPROVED JANUARY, 1988) LISTS CONTACTS AND INTERESTED PARTIES THROUGHOUT GOVERNMENT AND THE LOCAL COMMUNITY THAT ESTABLISH COMMUNICATION PATHWAYS TO ENSURE TIMELY DISSEMINATION OF PERTINENT INFORMATION. THE RI/FS AND THE PROPOSED PLAN WERE RELEASED TO THE PUBLIC IN JULY 1990. ALL OF THESE DOCUMENTS WERE MADE AVAILABLE IN BOTH THE ADMINISTRATIVE RECORD AT THE INFORMATION REPOSITORY MAINTAINED AT THE MARSHALL COUNTY PUBLIC LIBRARY. A PUBLIC COMMENT PERIOD WAS HELD FROM JULY 25, 1990 TO AUGUST 23, 1990. ALL COMMENTS WHICH WERE RECEIVED BY EPA PRIOR TO THE END OF THE PUBLIC COMMENT PERIOD, INCLUDING THOSE EXPRESSED VERBALLY AT THE PUBLIC MEETING. THESE COMMENTS ARE ADDRESSED IN THE RESPONSIVENESS SUMMARY (SECTION 14.0 OF THIS DOCUMENT).

#SRRA
SCOPE AND ROLE OF RESPONSE ACTION

THE SCOPE OF THIS RESPONSE ACTION IS TO ADDRESS MATERIALS CONTAINED IN THE DUMP, SURFICIAL DEBRIS, DEBRIS ACCUMULATIONS IN THE QUARRY POND, POND WATER & SEDIMENTS, AND THE PROTECTION OF GROUNDWATER FROM ADDITIONAL CONTAMINATION. THE FINAL REMEDY FOR THE CLEANUP OF THE

LEWISBURG DUMP SITE WILL ADDRESS CONCERNS FOR PUBLIC HEALTH AND THE ENVIRONMENT BY CONTROLLING EXPOSURE TO SITE CONTAMINANTS OF CONCERN THROUGH INSTITUTIONAL CONTROLS AS WELL AS BY REDUCING POTENTIAL MIGRATION OF CONTAMINANTS INTO SOILS, POND SEDIMENTS, SURFACE WATER AND GROUNDWATER.

WELL MONITORING AND GROUNDWATER ANALYSIS IS PROVIDED AS PART OF THE RESPONSE ACTION TO INSURE THAT REMEDIAL ACTIVITIES ARE EFFECTIVE AND THAT GROUNDWATER IS PROTECTED (SEVERAL NEARBY WATER WELLS {ONE AS CLOSE AS 200 FEET} COULD POTENTIALLY BE AFFECTED BY MATERIAL AT THE DUMP SITE). FACTORS THAT MAY DETERMINE THE DISTRIBUTION OF CONTAMINATION ARE: 1) THE AMOUNT OF CONTAMINANTS CONTAINED IN THE DUMP, 2) THE COMPLEX GEOLOGY (I.E., KARST TERRAIN THAT EXHIBITS NUMEROUS SINKHOLES) OF THE REGION, AND 3) THE HYDROGEOLOGY OF THE LIMESTONE AQUIFERS THAT UNDERLY THE SITE. THESE THREE VARIABLES WERE ANALYZED TO DETERMINE THE GENERAL FLOW DIRECTIONS OF GROUNDWATER FROM THE SITE, AND POTENTIAL RECEPTORS. INFORMATION GENERATED FOR THE RI INDICATE THAT GROUNDWATERS ORIGINATING FROM THE SITE MOST LIKELY FLOW TOWARDS THE EAST-SOUTHEAST ADJACENT TO THE SITE AND EVENTUALLY EASTWARD INTO BIG ROCK CREEK APPROXIMATELY 2000 FEET FROM THE SITE.

THE SELECTED REMEDY WILL SPECIFICALLY REDUCE THE POTENTIAL FOR THE

MIGRATION OF DEHP, COPPER, AND OTHER CONTAMINANTS OF CONCERN FROM THE LANDFILL AREA TO THE GROUNDWATER, TO THE QUARRY POND, AND EVENTUALLY OFF-SITE. SUBMERGED DEBRIS IN THE QUARRY POND WILL BE REMOVED TO REDUCE THE POTENTIAL ADDITIONAL CONTAMINATION OF POND WATER AND SEDIMENTS. THE LANDFILL CAP WILL BE REGRADED TO LIMIT THE AMOUNT OF WATER THAT MAY INFILTRATE THE CAP AND REDUCE THE POTENTIAL FOR LEACHATE DEVELOPMENT. IN ADDITION, THE EPA SELECTED ALTERNATIVE WILL LIMIT ACCESS TO THE SITE BY FENCING THE ENTIRE PROPERTY AND WILL PREVENT FUTURE USE OF THE PROPERTY BY IMPOSING DEED RESTRICTIONS WHICH WILL PREVENT THE FUTURE INSTALLATION OF PRIVATE WELLS.

INFORMATION FROM THE RI AND OTHER STUDIES INDICATE THAT THE LANDFILL CAP IS PRESENTLY UNDULATING (ALLOWING WATER TO POND ON THE SURFACE) AND HAS BEEN PENETRATED BY SMALL TREES AND OTHER VEGETATION. CONTAMINANTS SUCH AS DEHP AND COPPER ARE LIKELY ENTERING THE GROUNDWATER AT THE TEST-PIT AREA AND THEN APPEAR TO ENTER THE QUARRY POND WHERE THEY MAY EITHER BE INCORPORATED INTO THE POND SEDIMENTS, POND WATERS, OR MIGRATE OUT OF THE POND THROUGH THE COMPLEX HYDROGEOLOGIC NETWORK. MIGRATION OF GROUNDWATERS AND CONTAMINANTS THROUGH THE KARST SYSTEM AT THE LEWISBURG DUMP SITE IS VERY COMPLEX AND IT IS LIKELY THESE WATERS FROM THE LANDFILLED AREA DO NOT HAVE CONTINUOUS FLOW. THESE GROUNDWATERS MAY ACCUMULATE AND BE SPORADICALLY RELEASED TO THE QUARRY POND DURING SIGNIFICANT RAINFALL EVENTS, OR WHEN FRACTURES OR CAVITIES BECOME ENLARGED (INTERSECT). THIS INDICATES THE PROBABILITY THAT SIGNIFICANT VOLUMES OF CONTAMINANTS MAY BE TRANSPORTED (MASS-TRANSPORT) THROUGH UNDERGROUND KARST NETWORKS, AND THAT LEACHING MAY NOT BE THE ONLY MECHANISM FOR CONTAMINANTS TO ESCAPE THE LANDFILL. REMEDIAL ACTIONS SUCH AS LANDFILL CAP REGRADING ARE NEEDED SPECIFICALLY TO REDUCE AND TO

LIMIT THE AMOUNT OF WATER INFILTRATING THE LANDFILL CONSTITUENTS. THESE PROTECTIVE MEASURES ARE TO BE TAKEN SO THAT THE MCL FOR COPPER AND THE PROPOSED MCL FOR DEHP WILL NOT BE EXCEEDED IN OFF-SITE WELLS. (THE PROPOSED MCL OF 4.0 PPB FOR DEHP HAS BEEN EXCEEDED BY 8.0 PPB IN SUPPLEMENTAL SAMPLING IN ONE OF THE ON-SITE MONITORING WELLS).

THIS SELECTED REMEDY WILL ALSO ADDRESS AND REDUCE THE POTENTIAL FOR DIRECT CONTACT WITH AND THE POTENTIAL ACCUMULATION OF LANDFILL CONTAMINANTS, AND CONTAMINANTS ASSOCIATED WITH QUARRY POND DEBRIS BY FLORA AND FAUNA, (ESPECIALLY AQUATIC LIFE IN THE QUARRY POND).

THE FINAL REMEDY FOR THE SITE IS INTENDED TO ADDRESS THE ENTIRE SITE WITH REGARDS TO THE PRINCIPAL THREATS TO HUMAN HEALTH AND THE ENVIRONMENT POSED BY THE SITE AS INDICATED IN THE RISK ASSESSMENT, RI/FS REPORTS AND ENVIRONMENTAL SERVICES DIVISION (ESD, 1990) DATA. DATA WILL BE COLLECTED DURING THE FIVE YEAR REVIEW TO INSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THE FINDINGS OF THESE DATA ARE SUMMARIZED IN A LATER SECTION OF THIS DOCUMENT.

SUMMARY OF SITE CHARACTERISTICS

ENVIRONMENTAL SETTING

THE LEWISBURG DUMP SITE IS LOCATED WITHIN THE NASHVILLE BASIN (WITHIN THE CENTRAL BASIN) OF TENNESSEE (FIGURE 3), WHICH IS BORDERED ON ALL SIDES BY THE HIGHLAND RIM. THE HIGHLAND RIM (PLATEAU) PHYSIOGRAPHIC PROVINCE WHICH EXHIBITS ROCK OF MISSISSIPPIAN AGE RETAINS LITTLE OR NO RELIEF, EXCEPT NEAR MAJOR DRAINAGE AREAS. THIS "RIM" IS A VERY DISTINCT AND RUGGED SCARP APPROXIMATELY 300 FEET HIGH AND ALMOST COMPLETELY ENCIRCLES THE NASHVILLE BASIN.

ROCK TYPES EXPOSED THROUGHOUT THE HIGHLAND RIM ARE COMPRISED OF LIMESTONE, SILTSTONE, SHALE, AND MINOR AMOUNTS OF INTERSPERSED SANDSTONE. ALSO NOTED IS ABUNDANT BEDDED CHERT, CHERTY AND DOLOMITIC LIMESTONE, AND SILICASTONE THROUGHOUT THE MISSISSIPPIAN SECTION. A RELATIVELY THIN BED OF DEVONIAN AGE CHATTANOOGA SHALE UNDERLIES THE PREVIOUSLY MENTIONED MISSISSIPPIAN ROCKS. THIS DEVONIAN SHALE IS IN TURN UNDERLAIN BY OLDER ORDOVICIAN ROCKS OF THE NASHVILLE AND STONE RIVER GROUPS.

GEOLOGY AND HYDROGEOLOGY

ROCK UNITS EXPOSED AND BENEATH THE SITE RANGE FROM ORDOVICIAN TO CAMBRIAN. THE ROCK UNITS OF PRIMARY INTEREST TO THE SITE ARE PART OF THE ORDOVICIAN STONE RIVER GROUP (APPROXIMATELY 600-700 FEET THICK AT THE SITE) AND ARE DESCRIBED BELOW:

* RIDLEY LIMESTONE: CONSISTS PRIMARILY OF GRAY LIMESTONE THAT IS LOCALLY BLUISH OR LIGHT BROWN. THE BEDS ARE MASSIVE/ FLAT WITH THICKNESSES RANGING FROM 4 INCHES TO 4 FEET AND A DIP OF LESS THAN 3 DEGREES IN A NORTHWESTERLY DIRECTION. THE TOTAL THICKNESS OF THE RIDLEY FORMATION VARIES FROM 80-125 FEET. THE LIMESTONE BEDROCK EXPOSED AT THE SITE IS THE RIDLEY AND EXHIBITS VERTICAL JOINTS SPACED LATERALLY AT 10-20 FOOT INTERVALS AND TREND NORTH 20 TO 50 DEGREES EAST.

* PIERCE LIMESTONE: CONSISTS PRIMARILY OF THINLY-BEDDED, GRAY, AND SHALY LIMESTONE. THIS UNIT IS RELATIVELY MINOR IN MOST AREAS OF THE STATE AND IS APPROXIMATELY 25 FEET THICK (BRAHANA AND BRADLEY, 1986).

* MURFREESBORO LIMESTONE: CONSISTS OF MASSIVE, DENSE, DARK BLUE TO BLUISH-GRAY, CHERTY LIMESTONE. THIS FORMATION IS GENERALLY LARGE AND IS APPROXIMATELY 425 FEET THICK (BRAHANA AND BRADLEY, 1986).

A HYDROGEOLOGIC INVESTIGATION OF THE SITE WAS COMPLETED AND INCLUDED IN THE RI REPORT. THE PRESENCE AND ABUNDANCE OF LIMESTONE IN THIS LOCATION

IS EVIDENT AS A SINKHOLE-TYPE TOPOGRAPHY (KARST TERRAIN) IS TYPICAL THROUGHOUT THE NORTHERN HALF OF MARSHALL COUNTY, WHICH INCLUDES THE SITE (FIGURE 4). THE QUARRY IS LOCATED AT THE END OF A TOPOGRAPHICALLY LOW AREA THAT RESEMBLES A SMALL KARST VALLEY. THIS AREA IS FINGER-SHAPED AND GENTLY SLOPES TOWARDS THE EAST FOR APPROXIMATELY 2,000 FEET WHERE IT TERMINATES INTO BIG ROCK CREEK. GROUNDWATER, FOR THE MOST PART APPEARS TO FOLLOW TOPOGRAPHY TOWARDS THE EAST, EVENTUALLY INTO BIG ROCK CREEK. HOWEVER, THE KARST AQUIFER (RIDLEY FORMATION) IS HYDROLOGICALLY COMPLEX AND THERE APPEARS TO BE EVIDENCE THAT LOCAL DEVIATIONS IN GROUNDWATER FLOW OCCUR AT THE SOUTHEAST PORTION OF THE SITE (FIGURE 5). THESE LOCAL DEVIATIONS ARE EVIDENT IN THE FORM OF SPRINGS (OLD DISTILLERY SPRING) AND INTERMITTENT DISCHARGES (SWALLETS) ADJACENT TO A DRAINAGE RAVINE JUST SOUTHEAST OF THE QUARRY POND APPROXIMATELY 100-500 FEET. UNDER THE EPA GROUNDWATER PROTECTION STRATEGY (EPA, 1986), THE RIDLEY AQUIFER IS CLASSIFIED AS A CLASS II A AQUIFER BECAUSE IT IS USED FOR DRINKING BUT ALTERNATE SOURCES ARE READILY AVAILABLE AND THE GROUNDWATER IS NOT ECOLOGICALLY VITAL.

WATER FROM THE SITE APPEARS TO FLOW TOWARD THE QUARRY POND (FIGURE 6) WHERE THE LEVEL HAS BEEN NOTED TO REMAIN CONSTANT IN SPITE OF SEVERE DROUGHT. THIS INDICATES THAT THIS QUARRY POND IS GROUNDWATER FED BY A CONSTANT AND SIGNIFICANT SOURCE. WATER APPEARS TO EXIT THE QUARRY POND IN THE SUBSURFACE (THROUGH A BURIED CULVERT LOCAL RESIDENTS REMEMBER THAT WENT UNDER ROCK QUARRY ROAD) AND MOST LIKELY ENTERS THE SUBSURFACE DRAINAGE NETWORK WHERE WATER ONLY INTERSECTS THE SURFACE DURING HIGH RAINFALL EVENTS. FOR THE MOST PART, THE WATER THAT FLOWS OUT OF THE POND REMAINS SUBSURFACE IN THE COMPLEX DRAINAGE NETWORK AND ONLY INTERSECTS THE SURFACE AT OLD DISTILLERY SPRING AND SEVERAL OTHER OF THE

LARGER (UNNAMED) SWALLETS AND SINKHOLES ADJACENT AND SOUTHEAST OF THE SITE.

CONCEPTUAL MODELS PROPOSED FOR THE SITE RANGE FROM ONE THAT TREATS THE GROUNDWATER FLOW AS NORMAL IN AN UNCONFINED AQUIFER, TO A MODEL THAT PRESENTS THE AQUIFER AS ONE THAT COMPLETELY DENIES THE EXISTENCE OF A GROUNDWATER TABLE. IT APPEARS THAT THE GROUNDWATER REGIME MAY BE THE PRODUCT OF BOTH OF THESE MODELS, SUGGESTING THAT THEY REPRESENT TWO END MEMBERS IN A SEQUENTIAL DEVELOPMENT OF A DYNAMIC UNDERGROUND SYSTEM. INITIALLY, THE GROUNDWATER BEHAVES LIKE THAT IN AN UNCONFINED AQUIFER, BUT AS SOLUTIONING WATER PROGRESSIVELY WEATHERS THE FRACTURES AND BEDDING PLANES, THEY BECOME WIDENED AND EVENTUALLY LINKED. ONCE THESE FEATURES ARE LINKED, THE WATER SYSTEM BEGINS TO BE CONTROLLED BY THE ROCK STRUCTURE.

THE AVERAGE HYDRAULIC GRADIENT ACROSS THE SITE IS APPROXIMATELY 0.010. SPECIFIC TESTS HAVE NOT BEEN CONDUCTED AT THE SITE TO MEASURE THE HYDRAULIC CONDUCTIVITY OF THE BEDROCK. THE WEATHERED BEDDING PLANES IN THIS KARST AREA SUGGEST THAT HIGH FLOW RATES ARE POSSIBLE. HORIZONTAL CONDUCTIVITY AND POROSITY VALUES BASED ON THE ABOVE INFORMATION WOULD MOST LIKELY BE VARIABLE FOR THE SITE. AVERAGE HORIZONTAL CONDUCTIVITY GIVEN BY MORRIS AND JOHNSON (1967) FOR LIMESTONE IS 44 GALLONS PER DAY

(6.81 X (10-5) FEET/SECOND)). POROSITY VALUES IN LIMESTONE RANGE FROM 6.6 TO 55.7 PERCENT WITH AN ARITHMETIC MEAN OF 30 PERCENT. GROUNDWATER VELOCITY WITHIN THE RIDLEY AQUIFER WAS CALCULATED USING AN AVERAGE THICKNESS OF 100 FEET AND AN AVERAGE HYDRAULIC CONDUCTIVITY OF 4.0 X (10-5) FEET/SECOND. THE FLOW RATE OF 42 FEET/YEAR IS A ROUGH ESTIMATE GIVEN THE COMPLEXITY AND VARIABILITY OF THE KARST AQUIFER. THIS VALUE IS PRESENTED ONLY AS AN ESTIMATE TO GIVE AN UNDERSTANDING OF HOW FAST GROUNDWATER MAY BE TRAVELLING AT THE SITE ASSUMING AN EFFECTIVE POROSITY OF 30 PERCENT. THE DEEPEST MONITORING WELL IS APPROXIMATELY 84 FEET (MEASURED FROM THE GROUND SURFACE) AND THE ONLY AQUIFER ENCOUNTERED WAS THE RIDLEY LIMESTONE.

DEMOGRAPHY AND WATER USE

MARSHALL COUNTY IS SPARSELY POPULATED, HAVING ABOUT 20,000 PEOPLE. APPROXIMATELY 9,000 PEOPLE RESIDE WITHIN THE CITY LIMITS OF LEWISBURG. TEN HOMES OR APPROXIMATELY 30 PEOPLE ARE LOCATED WITHIN A ONE-HALF MILE RADIUS OF THE SITE. MANY PEOPLE IN THE AREA HAVE PUBLIC WATER, BUT APPROXIMATELY 8 RESIDENTS TO THE IMMEDIATE WEST OF THE SITE USE PRIVATE WELLS. FOUR OF THESE WELLS ARE WITHIN ONE-HALF MILE OF THE SITE (BLACKWELL ET AL., 1982). MOST CITY RESIDENTS ARE CONNECTED TO A PUBLIC SEWER SYSTEM. MOST COUNTY RESIDENTS, HOWEVER, HAVE SEPTIC SYSTEMS. MANY OF THESE SEPTIC SYSTEMS ARE OF QUESTIONABLE EFFICIENCY DUE TO THE THIN SOIL LAYER OVERLYING THE BEDROCK.

LAND USE

THE MAJORITY OF THE SITE AT PRESENT CONSISTS OF EXPOSED BEDROCK AND THE

QUARRY POND. ONLY A SMALL PORTION OF THE SITE CONTAINS SOIL COVER (THE LANDFILL AREA) THAT COULD SUPPORT AGRICULTURAL USES. CROP FARMING IN THE IMMEDIATE AREA IS NOT FEASIBLE DUE TO THE PREVIOUSLY DESCRIBED CONDITIONS. FUTURE LAND USES COULD INCLUDE INDUSTRIAL DEVELOPMENT. IN THIS CASE, EXPOSURES CHARACTERIZED BY CURRENT LAND USES WOULD ALSO APPLY TO FUTURE LAND USES, ASSUMING THE LANDFILL ITSELF IS LEFT UNDISTURBED. THUS, FUTURE POTENTIALLY EXPOSED POPULATIONS ARE ASSUMED TO BE SIMILAR TO CURRENT POPULATIONS. THIS ASSUMPTION IS IN FACT CONSERVATIVE SINCE WATER LINES ARE AVAILABLE TO RESIDENTS DOWNGRADIENT OF THE SITE. FUTURE RESIDENTS COULD RELY ON CITY WATER INSTEAD OF GROUND WATER FOR THEIR POTABLE WATER SOURCE.

CLIMATOLOGY

THE ANNUAL MEAN TEMPERATURE FOR THE AREA IS 57.6 DEGREES F., WITH JANUARY BEING THE COLDEST MONTH WITH A MEAN TEMPERATURE OF 36.2 DEGREES FAHRENHEIT. JULY IS THE WARMEST MONTH WITH A MEAN TEMPERATURE OF 77.5 DEGREES FAHRENHEIT. THE AVERAGE RAINFALL IS 54.2 INCHES WITH THE GREATEST PRECIPITATION GENERALLY OCCURRING DURING WINTER AND EARLY SPRING. THE AVERAGE SNOWFALL FOR THE LOCATION IS 7.5 INCHES. WINDS WITHIN THE LEWISBURG AREA ARE GENERALLY SOUTHERLY (40 PERCENT SOUTH, 10 PERCENT SOUTHEAST, 10 PERCENT SOUTHWEST) AND THE AVERAGE GROWING SEASON

CLOUD COVER IS LESS THAN THREE-TENTHS ON A TIME BASIS. CLOUD COVER MAY AVERAGE AS MUCH AS SEVEN-TENTHS DURING THE WETTER WINTER MONTHS.

#NEP
NATURE AND EXTENT OF THE PROBLEM

WASTE IDENTIFIED ON SITE

THE LEWISBURG DUMP SITE WAS OPERATED AS A MUNICIPAL/INDUSTRIAL LANDFILL BETWEEN THE MID 1960'S UNTIL 1979 WHEN THE DUMP WAS CLOSED. PRIOR TO 1987, THE SITE WAS STILL BEING USED FOR AUTHORIZED BURNING OF SAWDUST, TREE AND BRUSH REFUSE AND SOME UNCONTROLLED DUMPING THAT OCCURRED AFTER CLOSURE. NO PRECISE INVENTORY OF THE WASTE HAS BEEN COMPILED BUT THE FOLLOWING ARE TYPICAL OF THE WASTES WHICH WERE DISPOSED OF AT THIS SITE:

* HOUSEHOLD GARBAGE
* MISCELLANEOUS METALLIC WASTE
* PAINT STRIPPERS AND SOLVENTS
* INDUSTRIAL PLASTIC WASTE
* PICKLE SUMP MATERIAL
* ALKALINE CLEANER
* EMPTIED CONTAINERS OF ADHESIVES, LACQUERS, CEMENTS, AND PAINTS
* SHOE MANUFACTURING SCRAP
* PENCIL MANUFACTURING SCRAP
* DRUMMED WASTE
* FIBERGLASS INSULATION

SURFACE SOIL CONTAMINATION

MUCH OF THE AREA WITHIN THE SITE BOUNDARIES LACKS SOIL COVER WITH DIRECT EXPOSURES OF BEDROCK. HOWEVER, WITHIN THE LANDFILL 13 TEST-PITS WERE EXCAVATED WITH A TOTAL OF 16 SOIL SAMPLES RECOVERED. ALSO TO THE SOUTHWEST OF THE SITE APPROXIMATELY 800 FEET, 1 BACKGROUND SOIL SAMPLE WAS RECOVERED. VARIOUS DATA FOR THE TEST-PITS AND ASSOCIATED SOIL SAMPLES ARE LOCATED IN TABLES 1 & 2. TEST-PIT LOCATION ARE SHOWN IN FIGURE 7 . THE RESULTS SHOW ELEVATED ORGANIC AND INORGANIC CONCENTRATIONS. HIGH CONCENTRATIONS OF BIS(2-ETHYLHEXYL)PHTHALATE ARE ESPECIALLY NOTABLE, WHICH IS INDICATIVE OF PLASTICS (ONE OF THE TEST PITS NOTED 38,000 PPB). METAL CONCENTRATIONS ARE ALSO ELEVATED WHICH IS INDICATIVE OF METALLIC REFUSE AND INDUSTRIAL WASTE. GENERALLY, THE HIGHEST COMPOUND CONCENTRATIONS ARE FOUND IN SOIL SAMPLES SO-08, SO-10, AND SO-13 FROM TEST-PITS 8, 10, AND 13 RESPECTIVELY. HYDROCARBONS (OILS, FUELS, WAXES, ETC.) WERE ALSO DETECTED. DATA FROM THE SOIL ANALYSIS EFFORT IS LISTED IN TABLES 2-4.

GROUNDWATER CONTAMINATION

MONITORING WELL AND PIEZOMETER DATA IS LISTED IN TABLE 5. A COMPLETE

SUMMARY OF GROUNDWATER MONITORING WELL DATA AND GROUNDWATER SAMPLING DATA IS PRESENTED IN TABLES 6 & 7. ALL WELLS WERE SAMPLED FOR TARGET COMPOUND LIST (TAL) AND TARGET ANALYTE LIST (TAL) SUBSTANCES (TABLES 8-11). ORGANIC CONTAMINANTS FOUND IN THE GROUNDWATER INCLUDE: METHYLENE CHLORIDE (4.4 PPB) AND BIS(2-ETHYLHEXYL)PHTHALATE (12.0 PPB). TOLUENE WAS FOUND IN MINOR CONCENTRATIONS AND ELIMINATED FROM THE LIST OF CONTAMINANTS OF POTENTIAL CONCERN. ACETONE WAS ALSO FOUND IN ELEVATED CONCENTRATIONS IN THE POND SEDIMENTS (IT ALSO WAS FOUND IN PART TO BE A LABORATORY CONTAMINANT). INORGANIC CONTAMINANTS OF CONCERN ARE: ALUMINUM (1286 PPB), BARIUM (145 PPB), IRON (6077 PPB), AND MANGANESE (207 PPB).

SURFACE WATER CONTAMINATION

A TOTAL OF 19 SURFACE WATER SAMPLES WERE COLLECTED AT THE SITE. SAMPLES WERE COLLECTED PRIMARILY IN THE QUARRY POND BUT A BACKGROUND SURFACE WATER SAMPLE WAS COLLECTED AT THE INTERMITTENT CREEK ABOVE THE POND DURING A PERIOD OF HEAVY RAINFALL (AS THIS STREAM IS DRY DURING PERIODS OF DROUGHT). THE ANALYSIS REVEALED ONLY ONE ORGANIC CONTAMINANT (METHYLENE CHLORIDE) THAT WAS IDENTIFIED AT LOW CONCENTRATIONS (3.6 PPB). ANALYSIS ALSO REVEALED INORGANIC CONTAMINANTS OF CONCERN CONTAMINANTS ARE: ALUMINUM (72 PPB), BARIUM (148 PPB), COPPER (18 PPB), IRON (589 PPB), AND MANGANESE (133 PPB). NICKEL AT 31 PPB AND ZINC AT 44 PPB ALSO APPEAR TO BE ELEVATED IN THE POND WATER ESPECIALLY AT LOCATIONS ADJACENT TO THE LANDFILL AND THE JUNKYARD. A COMPLETE LIST OF ORGANIC AND INORGANIC CONTAMINANTS IS LISTED IN TABLES 12-15.

POND SEDIMENT CONTAMINATION

THE SEDIMENTS IN THE QUARRY POND (FIGURES 8 & 9) WHICH AVERAGE 2.0 FEET THICK WERE ALSO SAMPLED AND ANALYZED FOR ANOMALOUS ORGANIC AND INORGANIC COMPOUNDS. A TOTAL OF 19 SEDIMENT SAMPLES WERE RECOVERED AND ANALYSIS REVEALED THAT 5 ORGANICS AND 12 INORGANICS WERE IDENTIFIED ABOVE BACKGROUND LEVELS. THE ORGANIC COMPOUNDS ARE: METHYLENE CHLORIDE (44 PPB), BIS(2-ETHYLHEXYL)PHTHALATE (5672 PPB), ACETONE (1899 PPB), CARBON DISULFIDE (5 PPB), AND 2-BUTANONE (10 PPB). THE INORGANIC CONTAMINANTS IDENTIFIED ARE: ALUMINUM (19850 PPM), BARIUM (183 PPM), CHROMIUM (37 PPM), COPPER (70 PPM), IRON (40833 PPM), MANGANESE (2387 PPM), ZINC (618 PPM), LEAD (59 PPM), VANADIUM (26 PPM), SILVER (30 PPM), NICKEL (17 PPM), AND COBALT (13 PPM). TABLES 16-19 SUMMARIZE ANALYTICAL DATA FOR BOTH PHASE I AND II OF THE POND SEDIMENT SAMPLING EFFORT.

FISH CONTAMINATION

A TOTAL OF 11 FISH SAMPLES WERE RETRIEVED FROM THE QUARRY POND FOR ANALYSIS. OF THE 11 SAMPLES, 8 WERE GOLDEN SHINERS (NOTEMIGONUS CRYSOLENCAS) WHILE THE ADDITIONAL 3 SAMPLES WERE SPOTTED SUNFISH (LEPOMIS PUNCTATAS). PUBLISHED STUDIES ON AGE CLASS DISTRIBUTION OF THE GOLDEN SHINER (PFLIEGER, 1975) INDICATE THAT THE FISH COLLECTED AT LEWISBURG WERE APPROXIMATELY 5-6 YEARS OLD. THE AGE CLASS OF THE

SUNFISH IS ESTIMATED AT 3 YEARS. THE LENGTH TO WEIGHT DISTRIBUTION FOR BOTH FISH SPECIES IS SHOWN IN TABLE 20. ANALYSIS WAS PERFORMED ON TWO FISH FILLETS AND TWO COMPOSITE FISH SAMPLES (TABLES 21 & 22). SEVERAL ORGANICS AND INORGANICS WERE DETECTED IN THE SAMPLES AT CONCENTRATIONS HIGHER THAN THAT FOUND IN OTHER MEDIA. NO BACKGROUND FISH DATA WERE AVAILABLE WITH WHICH TO COMPARE SAMPLING RESULTS, NOR WERE SAMPLING EFFORTS EXTENSIVE ENOUGH TO ELIMINATE CHEMICALS BASED ON FREQUENCY OF DETECTION. THUS, ALL CHEMICALS DETECTED IN ONE OF THE TWO FISH FILLET SAMPLES WERE INCLUDED ON THE LIST OF CHEMICALS OF POTENTIAL CONCERN IN FISH. ORGANIC CONTAMINANTS FOUND IN THE FISH ARE: METHYLENE CHLORIDE (18 PPB), ACETONE (905 PPB), CARBON DISULFIDE (310 PPB), TOLUENE (33 PPB),1,1-DICHLOROETHENE (3 PPB), AND 2-BUTANONE (3 PPB). INORGANIC CONTAMINANTS IDENTIFIED ARE: ALUMINUM (69 PPM), BARIUM (6 PPM), CADMIUM (6 PPM), COPPER (9 PPM), IRON (544 PPM), MANGANESE (5 PPM), ZINC (143 PPM), NICKEL (12 PPM), AND LEAD (2 PPM).

AIR CONTAMINATION

A TOTAL OF 6 AIR SAMPLES WERE TAKEN THROUGHOUT ALL PHASES OF THE RI. THE FIRST ROUND OF SAMPLING TOOK PLACE BEFORE TEST-PIT EXCAVATION OR DRILLING ACTIVITIES. DURING THIS ROUND, TWO 24-HOUR COMPOSITE AIR SAMPLES WERE COLLECTED. IN ADDITION TO THESE 2 BACKGROUND SAMPLES, 2 DOWNGRADIENT SAMPLES AND 2 DUPLICATE SAMPLES WERE TAKEN. NO CONTAMINATION WAS DETECTED IN ANY OF THE SIX SAMPLES RECOVERED. TABLES 23 & 24 SUMMARIZE THE ANALYTICAL DATA FOR THE ANALYSIS OF AIR SAMPLES.

SINKHOLE CONTAMINATION

IN AN EFFORT TO FURTHER CHARACTERIZE THE GROUNDWATER/SURFACE WATER INTERFACE, THREE BACKGROUND AND FOUR DOWNGRADIENT SAMPLES WITHIN APPROXIMATELY A 1-MILE RADIUS OF THE SITE WERE COLLECTED (FIGURE 10). SAMPLING LOCATIONS WERE CHOSEN BASED ON THE FINDINGS OF THE FRACTURE TRACE ANALYSIS AND SITE RECONNAISSANCE, TOPOGRAPHIC GRADIENTS, AND THE SPECULATIVE LOCAL GROUNDWATER FLOW DIRECTION. MANY OF THE SINKHOLES IN THE AREA CONTAIN HOUSEHOLD GARBAGE AND APPLIANCES AND THESE LOCATIONS WERE NOT SAMPLED SINCE IT WOULD BE NEARLY IMPOSSIBLE TO RETRIEVE A SAMPLE FROM A CLOGGED SINKHOLE. A TOTAL OF 7 SINKHOLE WATER SAMPLES WERE COLLECTED AND ARE DESCRIBED IN THE SINKHOLE SAMPLING SUMMARY (TABLE 25). ALL SINKHOLE WATER SAMPLES RETAINED ACCEPTABLE WATER QUALITY. HOWEVER, SINKHOLE SAMPLE #2 (SK-02) DID HAVE ELEVATED LEVELS OF METALS AND IT WAS THOUGHT AT THE TIME THAT THIS SAMPLE WAS DOWNGRADIENT. IT IS NOW THOUGHT THAT THIS SAMPLE LOCATION IS NOT IN HYDROLOGIC CONNECTION WITH THE SITE AND MAY INDICATE ANOTHER SOURCE OF CONTAMINATION CLOSE TO ELLINGTON PARKWAY. AS FOR THE SINKHOLES ADJACENT AND DOWNGRADIENT FROM THE SITE TO THE SOUTHEAST, SLIGHTLY ELEVATED METALS WERE NOTED (AVERAGE CONCENTRATIONS WERE CALCULATED FROM DATA IN TABLES 26 & 27 SUCH AS CHROMIUM (27 PPB), COPPER (16 PPB), IRON (93 PPB), MANGANESE (20 PPB), NICKEL (25 PPB), ZINC (38 PPB). THE CONCENTRATIONS OF CONTAMINANTS DOWNGRADIENT ARE IN GENERAL, VERY LOW AND AT PRESENT ARE NOT CONSIDERED A THREAT TO HUMAN HEALTH AND THE ENVIRONMENT.

#AA
ADDITIONAL ANALYSIS

RESIDENTIAL WELL SURVEY

THE CITY OF LEWISBURG CONDUCTED A RESIDENTIAL WELL SURVEY OF ALL WELLS WITHIN A 2-MILE RADIUS OF THE SITE. A TOTAL OF 210 PROPERTY OWNERS WERE CONTACTED AND THIS INFORMATION YIELDED THAT 70 OUT OF 123 HOUSEHOLDS ARE CURRENTLY USING A GROUND WATER WELL FOR DOMESTIC OR LIVESTOCK USES. NO INDUSTRIAL OR MUNICIPAL WELLS WERE FOUND IN THE SURVEY AREA. THREE WELLS DIRECTLY UPGRADIENT, 2 WELLS DOWNGRADIENT, AND 5 SURROUNDING WELLS REVEALED NO ORGANIC OR INORGANIC CONTAMINANTS. A BREAKDOWN OF THE 70 WELLS IS PROVIDED AS TABLE 28, WHILE ANALYTICAL DATA IS INCLUDED IN TABLES 29 & 30.

FRACTURE TRACE ANALYSIS

A FRACTURE TRACE ANALYSIS WAS CONDUCTED IN ORDER TO BETTER IDENTIFY BEDROCK FRACTURES THAT MAY HAVE AN INFLUENCE ON GROUNDWATER MOVEMENT IN THE VICINITY OF THE SITE. THE SITE RECONNAISSANCE WAS USED TO IDENTIFY GEOLOGIC AND OTHER FEATURES WITHIN A 1-MILE RADIUS OF THE SITE. THE MEASURED FRACTURES AND JOINTS IN THE IMMEDIATE VICINITY OF THE SITE PRIMARILY TREND IN A NORTHEAST-SOUTHWEST DIRECTION. FRACTURE DENSITIES AROUND THE SITE APPEARED CONSISTENT WITH A SPACING OF 10 TO 20 FEET WHERE ROCK OUTCROPS WERE DISCOVERED. MAPPED FRACTURES AND JOINTS ARE IDENTIFIED IN FIGURE 10. THE LARGEST FRACTURES LOCATED NEAR THE SITE

ARE 300 TO 500 FEET NORTHEAST OF THE POND AND ALSO TREND NORTH-NORTHEAST. THESE FRACTURES DO NOT APPEAR TO INTERSECT THE WATER LEVEL OF THE QUARRY POND.

GEOPHYSICAL SURVEY

THE AREA OF THE LANDFILL AND THE POND WERE INVESTIGATED UTILIZING A GEOPHYSICAL SURVEY. PROTON PROCESSION MAGNETOMETERS WERE USED TO IDENTIFY AREAS OF BURIED MATERIAL IN THE LANDFILL OR SUBMERGED OBJECTS IN THE POND WHICH HAVE A HIGH METALLIC CONTENT. THIS SURVEY ALSO HELPED DETERMINE TEST-PIT EXCAVATION LOCATIONS AND SURFACE WATER/SEDIMENT SAMPLING LOCATIONS WITHIN THE QUARRY POND. THE SURVEY WAS ALSO UTILIZED TO DETERMINE THE LATERAL EXTENT OF THE LANDFILL. READINGS WERE TAKEN AT EACH NODE IN A GRID-SYSTEM CONTAINING 10-FOOT CENTERS. THE INTERPRETATION YIELDED A MAGNETIC CONTOUR MAP DEPICTING 5 DISTINCT AREAS OF MAGNETIC ANOMALIES WITHIN THE LANDFILL LABELED A-E (FIGURE 11). ALSO PRESENTED IS A MAGNETIC ISO-GRADIENT MAP OF THE QUARRY POND (FIGURE 12). MAGNETIC ANOMALIES APPEAR TO BE GROUPED WITHIN THE LANDFILL AREA IN THE SOUTHEAST AND THERE ARE SPORADIC ANOMALIES IN THE NORTHWESTERN PORTION OF THE LANDFILL. WITHIN THE QUARRY POND, THERE ARE ONLY 2 GENERAL AREAS WHERE ANOMALOUS READINGS WERE IDENTIFIED THESE AREAS ARE IN THE EASTERN AND WESTERN CORNERS OF THE POND. IN ALL CASES THE AREAS THAT

CORRESPONDED TO THE MAGNETIC ANOMALIES CONTAINED METALLIC SCRAP OR APPLIANCE WASTE AND IT APPEARS THAT NONE OF THESE ANOMALOUS AREAS CAN BE CLASSIFIED AS "HOT SPOTS".

#PRM
POTENTIAL ROUTES OF MIGRATION

SIX POTENTIAL ROUTES OF EXPOSURE HAVE BEEN IDENTIFIED BY WHICH LANDFILL MATERIAL MAY MOVE FROM THE SITE, THROUGH THE SURROUNDING ENVIRONMENTAL MEDIA, AND TO POINTS OF HUMAN EXPOSURE. FOR EACH IDENTIFIED PATHWAY, A REASONABLE MAXIMUM EXPOSURE (RME) SCENARIO HAS BEEN DEVELOPED. A SUMMARY OF POSSIBLE EXPOSURE PATHWAYS IDENTIFIED ARE DESCRIBED IN TABLE 31. THE PATHWAYS ARE: GROUNDWATER INGESTION, SURFACE WATER/FISH INGESTION, BEEF INGESTION, POND SEDIMENT CONTACT, SOIL CONTACT, AND AIR INHALATION. FURTHER ANALYSIS REVEALED 4 PATHWAYS THAT WERE TO BE EVALUATED IN THE BASELINE RISK ASSESSMENT. THE 4 PATHWAYS ARE:

* INGESTION OF DRINKING WATER

* INCIDENTAL INGESTION OF SURFACE WATER WHILE SWIMMING

* INGESTION OF FISH

* INGESTION OF HOME-PRODUCED BEEF

GROUNDWATER

MATERIALS FROM THE LANDFILL MAY LEACH INTO THE GROUNDWATER AND MIGRATE AWAY FROM THE SITE VIA FRACTURES AND CHANNELS IN THE LIMESTONE. THE GROUNDWATER EVENTUALLY MOVES DOWNGRADIENT FROM THE SITE GENERALLY IN AN EAST-SOUTHEAST DIRECTION, THROUGH THE POND ON TOWARDS THE BIG ROCK CREEK DRAINAGE. ONCE MATERIALS MIGRATE INTO THE GROUNDWATER, THEY MAY REACH HUMAN RECEPTORS VIA PRIVATE WELLS. WATER FROM THESE WELLS MAY BE USED FOR DOMESTIC PURPOSES OR WATERING LIVESTOCK. HOWEVER, BECAUSE THE RESIDENTIAL WELL SURVEY DID NOT INDICATE ANY CONTAMINATION, THE HOME-PRODUCED BEEF AND THE INGESTION OF DRINKING WATER PATHWAYS WERE NOT CONSIDERED VIABLE AT THIS TIME.

SURFACE WATER

LANDFILL MATERIALS MAY REACH THE SURFACE WATER OF THE POND BY TWO METHODS. FIRST, VIA GROUNDWATER TRAVELING UNDER THE LANDFILL AND TO THE POND. SECONDLY, MATERIAL MAY LEACH FROM THE EASTERN BOUNDARY OF THE LANDFILL DIRECTLY INTO THE POND. ONCE IN THE POND, HEAVY INORGANICS ARE RAPIDLY INCORPORATED INTO SUSPENDED AND BOTTOM SEDIMENTS. LITTLE OF THE LANDFILL MATERIAL WOULD REMAIN DISSOLVED IN THE WATER.

ONCE IN THE POND, HUMANS MAY BE EXPOSED TO LANDFILL MATERIALS VIA THE FOLLOWING ROUTES:

* DERMAL CONTACT WHILE SWIMMING

* INCIDENTAL INGESTION WHILE SWIMMING

* INGESTION OF FISH EXPOSED TO CONTAMINANTS IN SURFACE WATER

THE PRESENT CONDITION OF THE POND WOULD TEND TO DISCOURAGE SWIMMING. THE POND CONTAINS ABUNDANT GARBAGE AND SCUM IN PRESENT ON A PORTION OF THE SURFACE. ALSO ON THE EASTERN PERIMETER OF THE POND IS A LARGE ALGAL MAT. THE POND IS SURROUNDED BY STEEP 25 FOOT WALLS ON 3 SIDES AND THE ONLY OPEN ACCESS IS ON THE LANDFILL SIDE WHICH IS LINED WITH WILLOW TREES AND WEEDS. THERE IS NO BEACH TYPE AREA ON THE LANDFILL SIDE OF THE POND WHICH WOULD FURTHER DISCOURAGE PEOPLE FROM SWIMMING. THE DERMAL CONTACT WITH THE POND WATER WAS NOT EVALUATED SINCE THE METALS DO NOT READILY PARTITION ACROSS SKIN AS DO LIPOPHILIC SUBSTANCES.

POND SEDIMENTS

IT IS UNLIKELY THAT HUMANS COULD BE EXPOSED DIRECTLY TO THE POND SEDIMENT BECAUSE NO SEDIMENTS ARE ABOVE THE WATER AND THE POND REMAINS FULL THROUGHOUT THE YEAR. ALSO, NO WELL ESTABLISHED DRAINAGE CHANNEL EXISTS FOR SEDIMENTS TO MIGRATE FROM THE POND. HOWEVER, THE BURIED CULVERT UNDER ROCK QUARRY ROAD WILL RELEASE LARGE QUANTITIES OF WATER FROM THE POND DURING PERIODS OF HIGH RAINFALL. IT IS LIKELY THAT AT LEAST SMALL AMOUNTS OF SEDIMENT ARE TRANSPORTED THROUGH THIS CONDUIT DURING SIGNIFICANT RAINFALL EVENTS. CHEMICALS IN THE SEDIMENTS MAY PARTITION INTO THE WATER, BUT SUCH TRANSFERS OF CHEMICALS USUALLY OCCUR

IN THE OPPOSITE DIRECTION. NO PATHWAY HAS BEEN IDENTIFIED FOR EXPOSURE TO POND SEDIMENTS.

SOIL INGESTION

THE MATERIALS IN THE LANDFILL ARE BOUNDED ON THE SIDES AND BOTTOM BY LIMESTONE, AND BY AN APPROXIMATE 3-FOOT DEEP CLAY CAP ON THE TOP. THUS, LITTLE MOVEMENT OF CHEMICALS OF CONCERN FROM THE UNDERLYING LANDFILL MATERIAL INTO EXPOSED SURFACE SOILS IS EXPECTED TO OCCUR. ALSO, NO RECEPTOR TO SURFACE SOILS CONTAMINATION HAS BEEN IDENTIFIED FOR THE BASELINE RISK ASSESSMENT. INGESTION OF ANY APPRECIABLE AMOUNT OF SOIL IS LIMITED TO CHILDREN UNDER THE AGE OF SIX (EPA, 1989B). IT APPEARS UNLIKELY THAT CHILDREN WOULD INGEST SOIL AT THE SITE ESPECIALLY SINCE THERE IS SO LITTLE EXPOSED SOIL. WHERE THE SOIL IS THICKEST, THERE IS ABUNDANT VEGETATION THAT WOULD DISCOURAGE ANY DISTURBANCE. HOWEVER, THE BARBED WIRE FENCE (2-4 FEET, BREACHED IN AREAS) OFFERS LITTLE RESISTANCE TO ANYONE THAT MAY WANT TO GAIN ACCESS TO THE SITE (ESPECIALLY ADJACENT TO THE SOIL CAP NEXT TO ROCK QUARRY ROAD).

AIR INHALATION

THE AIR HAS BEEN ELIMINATED AS A VIABLE PATHWAY BECAUSE: 1) THE MAJOR

CHEMICALS ARE NONVOLATILE, INORGANIC COMPOUNDS AND DO NOT READILY PARTITION INTO THE AIR, AND 2) THE CLAY CAP OVER THE WASTE SHOULD TRAP ANY VOLATILES IN THE LANDFILL. THE TWO ROUNDS OF AIR MONITORING (BEFORE AND AFTER TEST-PIT EXCAVATION) AT THE SITE REVEALED THAT THERE WERE NO CONTAMINANTS BEING RELEASED INTO THE AIR.

#SSR
SUMMARY OF SITE RISKS

DURING THE RI/FS, AN ANALYSIS WAS CONDUCTED TO ESTIMATE THE HEALTH AND ENVIRONMENTAL PROBLEMS THAT COULD RESULT IF THE CONTAMINATION AT THE SITE WAS NOT REMEDIATED. THIS ANALYSIS, COMMONLY REFERRED TO AS A BASELINE RISK ASSESSMENT, EVALUATED POTENTIAL HEALTH EFFECTS FROM EXPOSURE TO CONTAMINATED GROUNDWATER VIA DIRECT CONSUMPTION; OR INDIRECTLY THROUGH INGESTION OF BEEF FROM THE CATTLE WHICH HAVE CONSUMED THE GROUNDWATER; ALSO FROM EXPOSURE TO CONTAMINATED SURFACE WATER VIA DIRECT CONTACT OR INGESTION OF FISH EXPOSED TO CONTAMINANTS IN THE SURFACE WATER.

IN ADDITION TO THESE PATHWAYS, THERE IS A POTENTIAL FOR FUTURE EXPOSURE THROUGH DIRECT CONTACT WITH LANDFILL MATERIALS IF FURTHER DETERIORATION OF THE LANDFILL CAP OCCURS. THIS PATHWAY WAS NOT QUANTIFIED IN THE RISK ASSESSMENT.

RISK OF LONG-TERM EXPOSURE TO CONTAMINANTS FROM THE SITE WERE CALCULATED BASED ON EXPOSURE POINT CONCENTRATIONS OF THE SITE CONTAMINANTS OF CONCERN IN THE MEDIA WHICH WERE CONSIDERED TO CONSTITUTE A COMPLETE

EXPOSURE PATHWAY. IN SUMMARY, ENVIRONMENTAL INFORMATION DERIVED FROM THE RI/FS INDICATE THAT THERE IS THE POTENTIAL FOR ADDITIONAL GROUNDWATER CONTAMINATION AND LEACHATE GENERATION IF THE LANDFILL CAP IS NOT REGRADED TO PREVENT INCREASING INFILTRATION AND POTENTIAL ADDITIONAL MIGRATION OF CONTAMINANTS OF CONCERN. ALSO NEEDED ARE SITE ACCESS AND DEED RESTRICTIONS TO PREVENT LANDFILL CAP DISTURBANCE AND PREVENT ANY FUTURE DRILLING OR USE OF THE GROUNDWATER. SITE CONDITIONS MAY FURTHER DETERIORATE IF THE SURFACE AND SUBMERGED GARBAGE IN AND AROUND THE QUARRY POND IS NOT REMOVED.

HUMAN HEALTH RISKS

SELECTION OF CONTAMINANTS OF CONCERN

THE FINDINGS OF THE RI CONFIRMED THE PRESENCE OF CONTAMINANTS IN THE LANDFILL MATERIAL, IN THE SOIL SAMPLES TAKEN FROM THE TEST-PITS, IN THE SURFACE WATER AND SEDIMENTS OF THE ABANDONED QUARRY POND, AND IN THE SHALLOW GROUNDWATER AQUIFER BENEATH THE SITE. THE HAZARD IDENTIFICATION INVOLVED THE SELECTION OF CONTAMINANTS OF CONCERN (COCS), WHICH ARE THE CONTAMINANTS LIKELY TO POSE THE GREATEST THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT. SELECTED CONTAMINANTS OF CONCERN AT THE LEWISBURG DUMP SITE ARE LISTED BELOW:

ORGANIC CONTAMINANTS

	ACETONE (1)
*	BIS(2-ETHYLHEXYL)PHTHALATE, (DEHP)
*	CARBON DISULFIDE
	4-METHYL-2-PENTANONE
	METHYLENE CHLORIDE
	2-BUTANONE

INORGANIC CONTAMINANTS

*	ALUMINUM		LEAD
	ARSENIC	*	MANGANESE
*	BARIUM		MERCURY
	CADMIUM		NICKEL
	CHROMIUM		SILVER
*	COPPER	*	ZINC
*	IRON		

1) WAS FOUND TO BE IN PART A LABORATORY CONTAMINANT.
*) CONTAMINANTS FREQUENTLY FOUND OR IN ELEVATED CONCENTRATIONS.

TABLE 32 CONTAINS THE CHEMICALS OF CONCERN IN EACH MEDIA AND THE RANGES AT WHICH THEY WERE DETECTED. ALTHOUGH SEDIMENTS ARE NOT CONSIDERED TO BE A COMPLETE EXPOSURE PATHWAY VIA THE DIRECT CONTACT ROUTE OF EXPOSURE, THEY ARE A POTENTIAL SOURCE OF GROUNDWATER CONTAMINATION. FOR THIS REASON, THE SEDIMENT DATA IS RETAINED WITH THE CHEMICALS OF POTENTIAL

CONCERN INFORMATION. TABLE 33 CONTAINS THE CONCENTRATIONS OF THE SITE CONTAMINANTS OF CONCERN USED TO DETERMINE EXPOSURE POINT CONCENTRATIONS. ALSO, THE LIST OF CONTAMINANTS OF CONCERN HAS BEEN MODIFIED (FROM THE LIST IN THE PROPOSED PLAN) BY OMITTING CONTAMINANTS THAT HAD RELATIVELY LOW CONCENTRATIONS. THESE CONTAMINANTS WERE: CHLORDANE, ETHYLBENZENE, XYLENE, PCB 1260, AND STRONTIUM.

EXPOSURE ASSESSMENT

THIS SECTION PRESENTS THE ESTIMATION OF CONTACT, OR EXPOSURE, BETWEEN A HUMAN OR ENVIRONMENTAL RECEPTOR AND CHEMICALS FOUND AT THE SITE. THE FOLLOWING PATHWAYS WERE CONSIDERED TO BE POTENTIALLY COMPLETE AND WERE EVALUATED IN THE RISK ASSESSMENT:

* INGESTION OF GROUNDWATER

* INGESTION OF BEEF FROM CATTLE WHICH HAVE CONSUMED CONTAMINATED GROUNDWATER

* INGESTION OF SURFACE WATER WHILE SWIMMING

* INGESTION OF FISH

THE GROUNDWATER PATHWAY ASSUMES THAT THE RECEPTOR WILL CONSUME ALL OF HIS DRINKING WATER FROM SITE-INFLUENCED WELLS AND WILL EAT HOME PRODUCED BEEF ALSO FROM CATTLE WATERED FROM SITE-INFLUENCED WELLS. THE KARST NATURE OF THE GROUNDWATER FLOW SYSTEM IN THE AREA OF THE SITE MAKES IT EXTREMELY DIFFICULT TO PREDICT GROUNDWATER CONCENTRATIONS VIA MODELING. FOR THIS REASON, ACTUAL WELL DATA WAS USED TO REPRESENT EXPOSURE POINT CONCENTRATIONS FOR CURRENT AND FUTURE SCENARIOS.

WITHIN THIS ASSESSMENT, THE POTENTIALLY EXPOSED POPULATIONS WERE STUDIED WITHIN A 2-MILE RADIUS OF THE SITE. THERE ARE APPROXIMATELY 275 RESIDENTIAL PROPERTIES (INCLUDING LIVESTOCK FARMS) IN THIS AREA AND APPROXIMATELY 70 HOUSEHOLDS USE GROUNDWATER FOR DOMESTIC PURPOSES AND ABOUT 40 PERCENT UTILIZE THE WATER FOR LIVESTOCK. DATA OBTAINED FROM THE RESIDENTIAL WELL SAMPLING AND ANALYSIS INDICATE THAT RESIDENTIAL WELLS DOWNGRADIENT FROM THE SITE HAVE ABOUT THE SAME METALS CONCENTRATION AS THE WELLS UPGRADIENT. THIS INDICATES THAT THE LANDFILL MATERIALS DO NOT APPEAR TO BE CURRENTLY AFFECTING NEARBY WELLS. THE GROUNDWATER IN THE SURFICIAL AQUIFER IN THIS AREA IS CLASSIFIED AS A CLASS II A AQUIFER BASED ON EPA'S GROUNDWATER PROTECTION STRATEGY.

THE ENVIRONMENTAL CHARACTERISTICS OF THE QUARRY POND DO NOT MAKE IT AN ATTRACTIVE SPOT FOR SWIMMING OR FISHING. THE SIDES ARE STEEP AND THE POND IS FILLED WITH TRASH AND HAS SCUM FLOATING ON THE SURFACE. ALTHOUGH THE POND IS AN UNLIKELY RECREATIONAL AREA, THE INGESTION OF SURFACE WATER WHILE SWIMMING AND FISH CONSUMPTION SCENARIOS WERE EVALUATED. THE DERMAL ABSORPTION PATHWAY WAS NOT EVALUATED DUE TO THE LOW TOXICITIES, LOW CONCENTRATIONS, AND A LOW RATE OF ABSORPTION OF THE

SURFACE WATER METALS OF CONCERN THROUGH THE SKIN. THE SEDIMENT EXPOSURE PATHWAY IS AN UNLIKELY PATHWAY FOR THE DIRECT CONTACT EXPOSURE ROUTE BECAUSE THE QUARRY CONDITIONS ARE NOT CONDUCIVE TO WADING (I.E., THE WALLS ARE STEEP AND THE POND HAS A DEPTH OF APPROXIMATELY FOUR FEET THROUGHOUT THE YEAR. HOWEVER, THE SEDIMENTS ARE A POTENTIAL SOURCE FOR GROUNDWATER CONTAMINATION. SOIL IS ALSO AN UNLIKELY EXPOSURE PATHWAY DUE TO THE THREE FOOT CLAY CAP WITH ABUNDANT VEGETATION OVER THE LANDFILLED AREA.

THE MAJOR EXPOSURE ASSUMPTIONS USED TO CALCULATE INTAKE LEVELS ARE CONTAINED IN TABLE 34.

TOXICITY ASSESSMENT

TOXICITY VALUES ARE USED IN CONJUNCTION WITH THE RESULTS OF THE EXPOSURE ASSESSMENT TO CHARACTERIZE SITE RISK. EPA HAS DEVELOPED CRITICAL TOXICITY VALUES FOR CARCINOGENS AND NON-CARCINOGENS. THE CPFS HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF (MG/KG/DAY)-1, ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN, IN MG/KG/DAY, TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE

EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER-BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CPFS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BASSOS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED. ALTHOUGH NO CARCINOGENS WERE CONSIDERED TO BE CONTAMINANTS OF CONCERN IN THE RISK ASSESSMENT FOR THE TWO MEDIA (GROUNDWATER AND SURFACE WATER) WHICH HAVE POTENTIAL COMPLETE EXPOSURE PATHWAYS, CARCINOGENS IN THE POND SEDIMENTS COULD POTENTIALLY CONTAMINATE GROUNDWATER SUPPLIES IN THE FUTURE. THE RISK ASSESSMENT RULED OUT DEHP AS A GROUNDWATER CONTAMINANT OF CONCERN BECAUSE THE ASSOCIATED BLANK SAMPLE ALSO CONTAINED DEHP. HOWEVER, SUBSEQUENT SAMPLING BY EPA'S ENVIRONMENTAL SERVICES DIVISION (ESD) INDICATED THAT AN ON-SITE WELL (MW-5) CONTAINED DEHP AT THE CONCENTRATION OF 12 UG/L. FOR THIS REASON GROUNDWATER CLEANUP CRITERIA WERE DERIVED FOR CHEMICALS WHICH WERE DETERMINED TO BE SITE CONTAMINANTS TO USE FOR FUTURE GROUNDWATER MONITORING. THE CPFS FOR SEDIMENT CARCINOGENIC CONTAMINANTS AND ARE CONTAINED IN TABLE 35.

REFERENCE DOSES (RFDS) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDS, WHICH ARE EXPRESSED IN UNITS OF MG/KG/DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS. ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDS ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH

UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS OF HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDS WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NONCARCINOGENIC EFFECTS TO OCCUR. THE RFDS FOR THE SITE CONTAMINANTS OF CONCERN ARE SUMMARIZED IN TABLE 35.

RISK CHARACTERIZATION

HUMAN HEALTH RISKS ARE CHARACTERIZED FOR POTENTIAL CARCINOGENIC AND NONCARCINOGENIC EFFECTS BY COMBINING EXPOSURE AND TOXICITY INFORMATION. EXCESS LIFETIME CANCER RISKS ARE DETERMINED BY MULTIPLYING THE INTAKE LEVEL WITH THE CANCER POTENCY FACTOR. THESE RISKS ARE PROBABILITIES THAT ARE GENERALLY EXPRESSED IN SCIENTIFIC NOTATION (E.G., 1 X (10-6)). AN EXCESS LIFETIME CANCER RISK OF 1 X (10-6) INDICATES THAT, AS A PLAUSIBLE UPPER BOUND, AN INDIVIDUAL HAS A ONE IN ONE MILLION ADDITIONAL CHANCE OF DEVELOPING CANCER AS A RESULT OF SITE-RELATED EXPOSURE TO A CARCINOGEN OVER A 70-YEAR LIFETIME UNDER THE ASSUMED SPECIFIC CONDITIONS AT THE SITE. THE AGENCY CONSIDERS INDIVIDUAL EXCESS CANCER RISKS IN THE RANGE OF (10-4) TO (10-6) AS PROTECTIVE; HOWEVER, THE (10-6) RISK LEVEL IS GENERALLY USED AS THE POINT OF DEPARTURE FOR SETTING CLEANUP LEVELS AT SUPERFUND SITES. THIS APPROACH IS CONSISTENT WITH AGENCY POLICY FOR THE IMPLEMENTATION OF SARA.

ALTHOUGH THE POTENTIAL COMPLETE PATHWAYS DO NOT HAVE CARCINOGENIC INDICATOR CHEMICALS BASED ON THE RI SAMPLING, THE TEST-PITS AND SEDIMENT DATA INDICATE THAT SEVERAL CARCINOGENS ARE PRESENT AT CONCENTRATIONS THAT COULD IMPACT GROUNDWATER QUALITY. IN ADDITION, DEHP WAS DETECTED IN AN ON-SITE MONITORING WELL IN SUPPLEMENTAL SAMPLING.

POTENTIAL CONCERN FOR NONCARCINOGENIC EFFECTS OF A SINGLE CONTAMINANT IN A SINGLE MEDIUM IS EXPRESSED AS THE HAZARD QUOTIENT (HQ), OR THE RATIO OF THE ESTIMATED INTAKE DERIVED FROM THE CONTAMINANT CONCENTRATION IN A GIVEN MEDIUM TO THE CONTAMINANT'S REFERENCE DOSE. BY ADDING THE HQS OF ALL CONTAMINANTS WITHIN A MEDIUM OR ACROSS ALL MEDIA TO WHICH A GIVEN POPULATION MAY REASONABLY BE EXPOSED, THE HAZARD INDEX (HI) CAN BE GENERATED. THE HI PROVIDES A USEFUL REFERENCE POINT FOR GAUGEING THE POTENTIAL SIGNIFICANCE OF MULTIPLE CONTAMINANT EXPOSURES WITHIN A SINGLE MEDIUM OR ACROSS MEDIA. A HI GREATER THAN 1.0 INDICATES THAT EXPOSURE EXCEEDS THE PROTECTIVE LEVEL.

THE ESTIMATED RISK CALCULATIONS WERE BASED ON PRESENT CONDITIONS AT THE SITE INCLUDING THE EXISTING CAP AND NO MAJOR INCREASES OF CONTAMINANTS IN THE SHALLOW RIDLEY LIMESTONE AQUIFER WHICH DISCHARGES INTO BIG ROCK CREEK. THE ONLY CARCINOGENIC COMPOUND THAT RECORDED A VALUE IN THE (10-4) TO (10-6) RISK RANGE FOR GROUNDWATER EXPOSURE IS DEHP WHICH WAS DETECTED AT A CONCENTRATION OF 12 PPB IN WELL MW-5 DURING SUPPLEMENTAL SAMPLING. THIS CONCENTRATION CORRESPONDS TO A INCREASED CANCER RISK OF 5 X (10-6). DEHP IS A POTENTIAL CONCERN AT THE SITE SINCE IT HAS BEEN IDENTIFIED IN A TEST-PIT AT 38,000 PPB, IN THE GROUNDWATER AT MW-5 AT 12 PPB, AND IN THE POND SEDIMENTS AT 6,000 PPB. THE PROPOSED MCL FOR DEHP

IS 4.0 PPB. AT THE PRESENT TIME IT APPEARS THAT DEHP POSES LITTLE THREAT TO HUMAN HEALTH OR THE ENVIRONMENT WHILE IT IS CONTAINED IN THE LANDFILL, HOWEVER, DETECTION OF THIS CARCINOGENIC COMPOUND IN THE TEST PIT, MONITORING WELL, AND POND SEDIMENT APPEARS TO INDICATE THAT THE CONTAMINANT POSSESSES THE POTENTIAL NOT ONLY TO MIGRATE VIA THE GROUNDWATER, BUT ALSO TO INCREASE CONCENTRATIONS IF REMEDIAL MEASURES ARE NOT TAKEN.

BECAUSE THE NONCARCINOGENIC CONTAMINANTS OF CONCERN AFFECT DIFFERENT TARGET ORGANS, THE CHEMICAL SPECIFIC HIS WERE NOT SUMMED. HOWEVER, THE HIS FOR EACH CHEMICAL WERE SUMMED ACROSS PATHWAYS. THE HIGHEST CUMULATIVE HI (0.347) WAS FOR BARIUM EXPOSURE. THE SUMMED HIS CALCULATED FOR EXPOSURE TO SITE CONTAMINANTS OF CONCERN IN THE GROUNDWATER AND SURFACE WATERS AT THE SITE WERE ALL BELOW 1.0 FOR HUMAN HEALTH.

ENVIRONMENTAL RISKS

ENVIRONMENTAL RECEPTORS INCLUDE FISH IN THE QUARRY POND AND OTHER FRESH WATER AQUATIC ANIMALS THAT INHABIT THE AREA, SUCH AS TURTLES AND AQUATIC WATER FOWL. BECAUSE ACCESS TO THE POND IS LIMITED, IT IS NOT LIKELY THAT MANY TERRESTRIAL ANIMALS USE THE POND AS A WATER SOURCE; HOWEVER,

GROUND WATER FOUND IN DOWNGRADIENT SINKHOLES MAY BE USED AS DRINKING WATER FOR SMALL MAMMALS. NO ENDANGERED SPECIES HAVE BEEN IDENTIFIED NEAR THE SITE (BROWN, 1988).

THE FRESH WATER CRUSTACEAN DAPHNIA WAS USED AS AN INDICATOR SPECIES TO ASSESS THE AQUATIC TOXICITY OF THE QUARRY POND. HAZARD QUOTIENTS WERE DERIVED FOR THE SURFACE WATER CONTAMINANTS OF CONCERN BY DIVIDING THE SURFACE WATER CONCENTRATION BY THE MAXIMUM ACCEPTABLE TOXICANT CONCENTRATION (MATC). COPPER CONTAMINATION IN THE POND WAS DETERMINED TO HAVE A HAZARD QUOTIENT OF 3.86. SINCE COPPER IN AQUATIC SYSTEMS CAN BE HIGHLY TOXIC, IT WILL BE NECESSARY TO REDUCE THE AMOUNT OF THIS METAL IN THE POND.

ALSO, SINCE THE TIME OF THE RI, ADDITIONAL (SUPPLEMENTAL) DATA HAS BEEN COLLECTED CONCERNING WATER HARDNESS IN THE POND. IN THE RI A VALUE OF 100 MG/L CACO3 WAS ASSUMED TO CALCULATE THE AQUATIC BASED POND WATER CLEANUP LEVELS FOR COPPER, LEAD, NICKEL AND ZINC. ACTUAL WATER HARDNESS DATA WAS OBTAINED IN JULY (1990) WITH A WATER HARDNESS OF 182 MG/L CACO3. THE DIFFERENT HARDNESS VALUES CAN BE ATTRIBUTED TO A VARIETY OF FACTORS WHICH INCLUDE: SEASONAL FLUCTUATION IN RAINFALL AMOUNTS AND FREQUENCY, SIZE OF THE POND, FLOW INTO AND OUT OF THE POND, GEOLOGIC FACTORS, AND OTHERS. GIVEN THAT ONLY ONE VARIABLE HAS BEEN ANALYZED, IT APPEARS THAT A COMPARISON OF ONLY TWO HARDNESS VALUES AND THE RESULTING CHANGES IN THE POND WATER CLEANUP VALUES, ARE INCONCLUSIVE. THUS, THE ORIGINAL VALUES PRESENTED IN THE RI WILL BE UTILIZED.

#DA

DESCRIPTION OF ALTERNATIVES

THE LANDFILL MATERIALS, SURFACE DEBRIS, SUBMERGED POND DEBRIS, CONTAMINATED SOIL, GROUNDWATER, AND THE QUARRY POND ARE UNDER CONSIDERATION FOR CLEANUP. A REMEDY FOR THE SITE IS PROPOSED TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT BY CONTROLLING EXPOSURE TO CONTAMINATED MATERIALS AND REDUCING ADDITIONAL MIGRATION OF CONTAMINANTS INTO SURROUNDING SOILS, SEDIMENTS, SURFACE WATER AND GROUNDWATER. CURRENTLY, ONE ON-SITE MONITORING WELL EXCEEDS THE PROPOSED MCL FOR DEHP.

THE FOLLOWING SUMMARY LISTS THE FIVE (5) REMEDIAL ALTERNATIVES UNDER CONSIDERATION FOR THE LANDFILL WASTES AND SHALLOW GROUNDWATER AT THE LEWISBURG DUMP SITE. THE FS REPORT CONTAINS A MORE DETAILED EVALUATION OF EACH ALTERNATIVE.

ALL BUT ONE (ALTERNATIVE 1) OF THESE ALTERNATIVES INVOLVE RESTRICTIONS ON LAND AND WELL USE AT THE SITE, UPKEEP OF THE FENCE AND PROPERTY, AND MONITORING TO ASSESS THE EFFECTIVENESS OF THE REMEDY.

ALTERNATIVE 1: NO ACTION

PRESENT WORTH (PW) COST: 133,082 (AMOUNT PRESENTED IS FOR WELL MONITORING ONLY. A DYE TRACER STUDY FOR $60,000 IS INCLUDED AS PART OF WELL MONITORING SINCE THE MOST EFFECTIVE SAMPLING PROGRAM CAN BE EFFICIENTLY OBTAINED WITH THE ASSISTANCE OF THIS METHOD.

YEARS TO IMPLEMENT: 0 (UP TO 5 YEARS IF MONITORING IS ELECTED).

CERCLA REQUIRES THAT THE "NO ACTION" ALTERNATIVE BE CONSIDERED AT EVERY SITE. THIS ALTERNATIVE MUST BE CONSIDERED SINCE: 1) IT MAY BE MORE HARMFUL TO HUMAN HEALTH AND THE ENVIRONMENT TO DISTURB CONTAMINATION AT SOME SITES, AND 2) IT MAY BE THE ONLY LOW RISK, COST EFFECTIVE ALTERNATIVE. UNDER THIS ALTERNATIVE, NO SOIL, SEDIMENT, GROUNDWATER OR DEBRIS CLEANUP, CONTAINMENT OR TREATMENT WOULD TAKE PLACE. THE ONLY REDUCTION OF CONTAMINANT LEVELS WOULD OCCUR VIA NATURAL PROCESSES SUCH AS DISPERSION OR ATTENUATION. THE ONLY COSTS INCURRED WOULD BE FOR MONITORING THE SITE.

ALTERNATIVE 2: DEED RESTRICTIONS AND SITE ACCESS RESTRICTIONS (FENCING)

PRESENT WORTH COST:	$185,000
PW CAPITAL COST:	$127,000
PW O & M COST:	$57,000
YEARS TO IMPLEMENT:	0.3 (UP TO 5 YEARS IF MONITORING IS ELECTED)

THIS ALTERNATIVE WILL INSURE THAT SITE ACCESS IS LIMITED THROUGH INSTALLATION OF A SECURITY FENCE (4,650 LINEAR FEET) WHILE ALSO ESTABLISHING CONTROLS THAT ENSURE PROPER MAINTENANCE OF THE SITE THROUGH

DEED RESTRICTIONS. THIS ALTERNATIVE DOES NOT IMPROVE RESIDUAL RISKS ABOVE BASELINE CONDITIONS. ANY REDUCTIONS IN TOXICITY, MOBILITY, AND VOLUME ARE THE SAME AS THOSE DISCUSSED FOR ALTERNATIVE 1. IMMEDIATE OR NEAR-TERM COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) OR GUIDANCE TO BE CONSIDERED (TBCS) CANNOT BE ACHIEVED WITH THIS ALTERNATIVE.

ALTERNATIVE 3 (MODIFIED):INSTITUTIONAL CONTROLS PLUS: REMOVAL OF SURFACE DEBRIS, LANDFILL CAP REGRADING, LONG-TERM WELL MONITORING AND ANALYSIS.

PRESENT WORTH COST:	$791,512 - $1,189,741
PW CAPITAL COST:	$521,370 - $919,598
PW O & M COST:	$270,142
YEARS TO IMPLEMENT:	0.3 (TO COMPLETE REMEDIAL ACTION) 5 YEARS FOR WELL MONITORING

DUE TO SEVERAL CONCERNS RAISED DURING THE PUBLIC MEETING AND IN THE COMMENTS TO EPA'S PROPOSED PLAN SUBMITTED TO THE EPA ON BEHALF OF THE LEWISBURG ENVIRONMENTAL RESPONSE COMMITTEE (PRPS), THE RECOMMENDED ALTERNATIVE HAS BEEN MODIFIED. THIS ALTERNATIVE IS SIMILAR TO THE ORIGINALLY PRESENTED ALTERNATIVE 3 WITH THE FOLLOWING MODIFICATIONS: 1) LANDFILL CAP "REGRADING", IS STATED INSTEAD OF "UPGRADING", 2) REGRADING

OF THE CAP (APPROXIMATELY 0.41 ACRES) WILL PREVENT ADDITIONAL INFILTRATION OF WATER DUE TO LANDFILL CAP UNDULATION - WHICH WILL MEET STATE AND FEDERAL REQUIREMENTS WITHOUT CAP "UPGRADING". THIS ALTERNATIVE IMPLEMENTS THE INSTITUTIONAL CONTROLS DISCUSSED FOR ALTERNATIVE 2 AND ADDS SEVERAL ADDITIONAL REMEDIAL MEASURES THAT ARE DESIGNED TO REDUCE POTENTIAL EXPOSURES OR RELEASE OF CONTAMINANTS FROM THE SITE. REMEDIAL MEASURES INCLUDE THE REMOVAL OF SUBMERGED POND DEBRIS AND SITE SURFACE DEBRIS, REPLACEMENT OF THE PLASTIC TEST PIT CAPS WITH CLAY AND SOIL MATERIAL (2.5 FEET OF CLAY AND 12 INCHES OF SOIL-188 CUBIC YARDS OF CLAY AND 50 YARDS OF TOPSOIL), AND THE REGRADING OF THE CAP TO MEET ALL APPLICABLE STATE STANDARDS FOR CLOSURE OF SANITARY LANDFILLS. THE LANDFILL CAP REGRADING WILL REQUIRE APPROXIMATELY 670 CUBIC YARDS OF FILL TO ADD AN ADDITIONAL 12 INCH THICK COVER TO THE CAP. SUBMERGED DEBRIS THAT MAY PRESENT A PROBLEM WILL BE MOVED FROM THE POND. RECYCLABLE MATERIAL WILL BE SEPARATED OUT AND NONRECYCLABLE MATERIAL WILL BE DISPOSED IN AN APPROVED AND PERMITTED SANITARY LANDFILL. THIS MAY INCLUDE THE ADDITION OF EXTRA CLAY OR SOIL, PROPER GRADING AND SURFACE DRAINAGE CONTROLS, REMOVAL OF TREES FROM THE CAP AREA, AND THE ESTABLISHMENT OF ADEQUATE VEGETATIVE COVER. IN THE EVENT THAT A SUITABLE LOCATION CANNOT BE FOUND FOR DISPOSAL OF THIS NON-HAZARDOUS MATERIAL, IT WILL BE DISPOSED OF ON-SITE BEFORE RESTORATION OF THE LANDFILL CAP TAKES PLACE. ANY HAZARDOUS WASTES FOUND WILL BE DISPOSED OF OFF-SITE AT AN APPROVED RCRA DISPOSAL SITE. IN ADDITION, MONITORING EFFORTS AND ANALYSIS ARE INCLUDED TO MEASURE THE EFFECTIVENESS OF THE REMEDIAL ACTIVITIES. A DYE TRACER STUDY OR OTHER ACCEPTABLE METHOD WILL BE USED TO DETERMINE THE MOST SUITABLE GROUNDWATER SAMPLING LOCATIONS FOR LONG-TERM MONITORING. THIS WILL BE IMPLEMENTED DURING THE REMEDIAL DESIGN PHASE OF THE SUPERFUND PROGRAM (IMMEDIATELY FOLLOWS THE RI/FS).

MONITORING EFFORTS WILL INCLUDE THE COLLECTION OF SURFACE WATER SAMPLES FROM THE POND AND GROUNDWATER SAMPLES FROM SPECIFIC ON-SITE AND OFF-SITE LOCATIONS. THIS ALTERNATIVE MEETS ALL NCP (NATIONAL CONTINGENCY PLAN) REQUIREMENTS AND WILL BE IN COMPLIANCE WITH ALL ARARS. UNLIKE ALTERNATIVES 1 & 2 (WHICH ARE UNABLE TO ACHIEVE WATER QUALITY-BASED ARARS) THIS ALTERNATIVE ACTIVELY ISOLATES THE MAJOR CONTRIBUTING SOURCES WHICH WILL ALLOW COMPLIANCE WITH ENVIRONMENTAL STANDARDS.

MODIFIED ALTERNATIVE 3 ALSO PROVIDES THREE (3) OPTIONS FOR DISPOSAL OF SUBMERGED POND DEBRIS AND SURFACE DEBRIS REMOVAL. THE DIFFERENCES IN COST BETWEEN THE 3 OPTIONS ARE COMPLETELY DEPENDENT UPON THE DISPOSAL OF THE WASTES EXTRACTED FROM THE POND AND THE SITE. WHILE IT IS ANTICIPATED THAT THE WASTE REMOVED WILL BE NON-HAZARDOUS AND CAN BE DISPOSED OF EITHER AT AN APPROVED OFF-SITE SANITARY LANDFILL OR BY DISPOSAL ON-SITE, THE FINAL OPTION SELECTION WILL TAKE PLACE DURING THE RD/RA PHASE OF THE PROJECT.

ALTERNATIVE 4:INSTITUTIONAL CONTROLS PLUS: REMOVAL AND TREATMENT OF MATERIAL FROM THE SITE AND ISOLATION OF POND SEDIMENTS

PRESENT WORTH COST: $47,000,000 - $100,000,000
PW CAPITAL COST: $43,000,000 - $100,000,000

PW O& M COST: $270,000
YEARS TO IMPLEMENT: 2 FOR CONSTRUCTION ACTIVITIES 5 YEARS (TOTAL) FOR WELL MONITORING

THIS ALTERNATIVE INVOLVES THE REMOVAL, TREATMENT, AND DISPOSAL OF ALL MATERIAL IN THE LANDFILL AND ISOLATION OF THE POND SEDIMENTS FROM THE AQUATIC COMMUNITY. REMEDIAL ACTIONS ASSOCIATED WITH ALTERNATIVE 3 ARE INCLUDED WITH THE EXCEPTION OF TEST PIT CAP REPLACEMENTS. THESE ACTIONS INCLUDE INSTITUTIONAL CONTROLS, SUBMERGED AND SURFACE DEBRIS REMOVAL FROM THE QUARRY POND, AND MONITORING AND ANALYSIS OF THE GROUNDWATER. EXTRACTION OF THE LANDFILL MATERIAL WILL REQUIRE APPROXIMATELY 9000 TRUCKLOADS (OR APPROXIMATELY 120,000 CUBIC YARDS) OF MATERIAL TO BE SHIPPED OFF-SITE. ALSO, THIS MATERIAL WILL BE TREATED BY SOLIDIFICATION/ FIXATION AND DEWATERING PROCESSES. THESE ACTIONS WILL INCREASE POTENTIAL HUMAN AND ENVIRONMENTAL EXPOSURES TO CONTAMINANTS. INCREASED EXPOSURE OF CONTAMINANTS OR EXCAVATION ACCIDENTS WILL ALSO RESULT IN INCREASED LEACHATE GENERATION THAT MAY ADVERSELY AFFECT HUMAN AND ENVIRONMENTAL RECEPTORS IN THE VICINITY OF THESE ACTIVITIES. LANDFILL MATERIAL EXTRACTION SATISFIES THE CERCLA STATUTORY PREFERENCE AS A PRINCIPLE ELEMENT OF THE REMEDY. HOWEVER, DESPITE THE LONG-TERM EFFECTIVENESS AND PERMANENCE OF THIS ALTERNATIVE, OTHER SERIOUS SHORT-TERM IMPACTS IN ADDITION TO ONES PREVIOUSLY DESCRIBED ARE PRESENT. ISOLATION OF THE EXISTING POND SEDIMENTS FROM THE AQUATIC WILDLIFE REQUIRES ADDITION OF NEW SUBSTRATE CONSISTING OF UNCONTAMINATED SOIL. ADDITION OF THE SUBSTRATE MATERIAL WILL POTENTIALLY CREATE A THICK CLOUD OF SUSPENDED MATERIAL THAT WILL REACH ALL AREAS OF THE POND AND SERIOUSLY OR FATALLY IMPACT MANY AQUATIC ORGANISMS. CONSIDERING THE APPLICATION OF THE ISOLATING SOIL LAYER IN THE POND, SECTION 404 OF THE

CWA (ARAR) SHOULD BE COMPLIED WITH BY COMPLYING WITH PERMIT STANDARDS FOR THE DISCHARGE OF FILL INTO WATERS OF THE UNITED STATES. THIS CAN BE ACCOMPLISHED BY CONTACTING THE ARMY CORPS. OF ENGINEERS TO GET THE STANDARDS INFORMATION AND FOLLOW THE REGULATIONS. HOWEVER, IT SHOULD BE NOTED THAT IT IS NOT MANDATORY TO APPLY FOR A PERMIT THROUGH THE ACES.

ALTERNATIVE 5:COMPLETE REMOVAL OF LANDFILL MATERIAL, POND SEDIMENTS, AND SURFACE AND SUBMERGED DEBRIS

PRESENT WORTH COST:	$47,000,000 - $100,000,000
PW CAPITAL COST:	$47,000,000 - $100,000,000
PW O & M COST:	$23,000
YEARS TO IMPLEMENT:	2 FOR CONSTRUCTION ACTIVITIES 5 FOR TOTAL WELL MONITORING

THIS ALTERNATIVE OFFERS A LONG-TERM EFFECTIVE AND PERMANENT REMEDY. ALL SITE-RELATED CONTAMINANTS WILL BE REMOVED. THE SECURITY FENCE PREVIOUSLY DISCUSSED WILL BE INSTALLED AS PART OF THIS REMEDY. THE PURPOSE OF THE FENCE WILL BE TO PREVENT JUNKYARD ACTIVITIES FROM IMPACTING THE SITE AND TO DISCOURAGE UNCONTROLLED DUMPING. THIS ALTERNATIVE ACHIEVES THE CERCLA STATUTORY PREFERENCE FOR REMOVAL AND/OR TREATMENT AS A PRINCIPLE ELEMENT OF THE REMEDY. THIS IS ACCOMPLISHED BY

EXTRACTING RECYCLES WHERE POSSIBLE AND TREATING CONTAMINANTS AS DESCRIBED IN ALTERNATIVE 4
(EXTRACTION/SOLIDIFICATION/FIXATION/DEWATERING/ DISPOSAL) WITH THE EXCEPTION THAT IN ALTERNATIVE 5, THE POND SEDIMENTS WILL BE EXTRACTED AND TREATED. THE SHORT-TERM EFFECTIVENESS AND IMPACTS OF THIS REMEDY CAN BE CONSIDERED IDENTICAL TO THAT DISCUSSED FOR ALTERNATIVE 4. THE SHORT-TERM IMPACTS ON THE LOCAL AQUATIC COMMUNITY IN THE POND COULD BE DEVASTATING. IN ADDITION, SHORT-TERM IMPACTS ASSOCIATED WITH ADDED LEACHATE GENERATION DURING LANDFILL EXCAVATION ACTIVITIES AND REMEDIAL ACTION RELATED ACCIDENTS COULD ALSO PROVE SIGNIFICANT. CONSIDERING SECTION 404 OF THE CWA, THE RESPONSE IS THE SAME AS ALTERNATIVE 4.

#SCAA
SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THE REMEDIAL ALTERNATIVES DEVELOPED DURING THE LEWISBURG DUMP SITE FS WERE EVALUATED BY US EPA USING THE FOLLOWING NINE CRITERIA. THE ADVANTAGES AND DISADVANTAGES OF EACH ALTERNATIVE WERE THEN COMPARED TO IDENTIFY THE ALTERNATIVE PROVIDING THE BEST BALANCE AMONG THESE NINE CRITERIA.

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ADDRESSES WHETHER OR NOT AN ALTERNATIVE PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS ARE ELIMINATED, REDUCED OR CONTROLLED THROUGH TREATMENT AND ENGINEERING OR INSTITUTIONAL CONTROLS.

2. COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

(ARARS) ADDRESSES WHETHER OR NOT AN ALTERNATIVE WILL MEET ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OR PROVIDE GROUNDS FOR INVOKING A WAIVER.

3. LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE ABILITY OF AN ALTERNATIVE TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, OVER TIME, ONCE CLEANUP OBJECTIVES HAVE BEEN MET.

4. REDUCTION OF TOXICITY, MOBILITY OR VOLUME IS THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES AN ALTERNATIVE MAY EMPLOY.

5. SHORT-TERM EFFECTIVENESS INVOLVES THE PERIOD OF TIME NEEDED TO ACHIEVE PROTECTION AND ANY ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD UNTIL CLEANUP OBJECTIVES ARE ACHIEVED.

6. IMPLEMENTABILITY IS THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF AN ALTERNATIVE, INCLUDING THE AVAILABILITY OF GOODS AND SERVICES NEEDED TO IMPLEMENT THE SOLUTION.

7. COST INCLUDES CAPITAL COSTS, AS WELL AS OPERATION AND MAINTENANCE COSTS.

8. AGENCY ACCEPTANCE INDICATES WHETHER, BASED ON ITS REVIEW OF THE TECHNICAL DOCUMENTS FOR ALL ASPECTS OF THE SITE INVESTIGATION, AND THE PROPOSED PLAN, THE US EPA AND THE TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT (TDHE) AGREE ON THE PREFERRED ALTERNATIVE.

9. COMMUNITY ACCEPTANCE INDICATES THE PUBLIC SUPPORT OF A GIVEN ALTERNATIVE. THIS CRITERIA IS DISCUSSED IN THE RESPONSIVENESS SUMMARY.

LANDFILL WASTES AND GROUNDWATER

THE FOLLOWING IS THE EVALUATION OF THE FIVE (5) ALTERNATIVES FOR THE LANDFILL WASTES, QUARRY POND, AND GROUNDWATER USING THE NINE CRITERIA.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALL THE ALTERNATIVES CONSIDERED ABOVE WITH THE EXCEPTION OF THE NO ACTION ALTERNATIVE (ALTERNATIVE 1) AND ALTERNATIVE 2 WOULD BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. ALTERNATIVES 1 AND 2 ARE NOT PROTECTIVE BECAUSE THEY ALLOW BIOACCUMULATION OF CONTAMINANTS BY WILDLIFE AT THE SITE AND IN THE QUARRY POND. ALSO, FAILURE TO MAINTAIN AND REGRADE (RESTORE) THE LANDFILL CAP MAY RESULT IN MIGRATION OF UNACCEPTABLE LEVELS OF CONTAMINANTS TO THE QUARRY POND AND EVENTUALLY INTO BIG ROCK CREEK. OTHER POSSIBLE CONSEQUENCES ARE HUMAN OR ANIMAL EXPOSURE TO CONTAMINANTS THROUGH SOIL OR SEDIMENT CONTACT. ALTERNATIVE 3 WOULD PREVENT HUMAN OR ANIMAL EXPOSURE TO ON-SITE CONTAMINANTS THROUGH THE IMPLEMENTATION OF INSTITUTIONAL CONTROLS, LANDFILL CAP RESTORATIONS, REMOVAL OF SURFACE DEBRIS AND SUBMERGED DEBRIS IN THE QUARRY POND, AND

WELL MONITORING AND SITE MAINTENANCE. ALTERNATIVES 4 AND 5 WOULD ALSO BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT BY REMOVING ALL OF THE SITE CONTAMINANTS BUT HAVE SERIOUS SHORT-TERM EFFECTIVENESS AND IMPLEMENTABILITY PROBLEMS.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ALTERNATIVE 1 IS NOT IN FULL COMPLIANCE WITH ARARS FOR THE CLOSURE OF SANITARY LANDFILLS AND WOULD ALLOW FOR POSSIBLE DIRECT CONTACT OR EXPOSURE TO HAZARDOUS SUBSTANCES. ALTERNATIVE 2 WHILE LIMITING POSSIBLE DIRECT CONTACT OR EXPOSURE, DOES NOT PROVIDE A SUFFICIENT REDUCTION OF CONTAMINANTS TO MEET ALL ARARS. ALTERNATIVE 3 IS IN FULL COMPLIANCE WITH ALL ARARS. ALTERNATIVES 4 AND 5 WILL MEET ALL ARARS WITH THE POSSIBLE (UNLIKELY) EXCEPTION OF THE CLEAN WATER ACT (CWA) PROVISIONS CONCERNING FILL OPERATIONS IN US WATERS. HOWEVER, AS WAS DISCUSSED PREVIOUSLY, IT APPEARS THAT FOLLOWING THE PERMIT REGULATIONS PROVIDED THROUGH THE ARMY CORPS OF ENGINEERS SHOULD BE SUFFICIENT TO MEET THIS ARAR.

REDUCTION OF TOXICITY, MOBILITY OR VOLUME

ALTERNATIVES 1,2 AND 3 DO NOT INVOLVE THE TREATMENT OF THE LANDFILLED

WASTES, THERE WILL BE NO DIRECT REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF LANDFILL CONTAMINANTS. INDIRECTLY, ALTERNATIVE 3 WILL REDUCE THE MOBILITY OF LANDFILL CONTAMINANTS BY REDUCING INFILTRATION IN THE LANDFILL CAP AND POTENTIAL ADDITIONAL MIGRATION OF DEHP AND COPPER INTO THE GROUNDWATER, THE QUARRY POND, AND EVENTUALLY OFF-SITE. ALTERNATIVE 3 WILL ALSO REDUCE THE THREAT OF EROSIONAL PROBLEMS BY LANDFILL CAP REGRADING AND THE ADDITION OF 670 CUBIC YARDS OF FILL. ALTERNATIVES 4 & 5 DO INVOLVE REMOVAL AND TREATMENT OF CONTAMINATED MATERIALS, SOILS, AND POND SEDIMENTS (ALTERNATIVE 5 ONLY), AND WOULD PROVIDE A SIGNIFICANT REDUCTION FIRST BY COMPLETE REMOVAL OF CONTAMINANTS, AND SECOND, BY THE REDUCTION OF TOXICITY AND MOBILITY THROUGH TREATMENT. THE TREATMENT PROCESS INVOLVES SOLIDIFICATION/FIXATION OF FINES AND ASSOCIATED DEWATERING PROCESSES FOR 120,000 CUBIC YARDS OF LANDFILL CONTAMINANTS, AND FOR ALTERNATIVE 5 ONLY, THE EXTRACTION OF 4,000 CUBIC YARDS OF POND SEDIMENTS BY VACUUM DREDGING AND TREATMENT AS ABOVE. HOWEVER, DUE TO THE EXCESSIVE AMOUNT OF MATERIALS AT THE SITE (126,025 CUBIC YARDS), IT IS NOT FEASIBLE TO REMOVE AND PERFORM TREATMENT SINCE: 1) THE MAJORITY OF MATERIALS DO NOT POSSESS HIGH LEVELS OF CONTAMINATION, AND 2) THE COSTS WOULD BE EXORBITANT.

LONG-TERM EFFECTIVENESS

ALL OF THE ALTERNATIVES EXCEPT FOR THE NO ACTION ALTERNATIVE AND ALTERNATIVE 2 PROVIDE LONG-TERM EFFECTIVENESS AND PERMANENCE. THE NO ACTION ALTERNATIVE ASSUMES THAT BASELINE CONDITIONS WILL NOT CHANGE (NO CONTROLS WILL BE IN PLACE TO PREVENT CHANGES) EVEN THOUGH LEACHATE WITH LOW LEVELS OF CONTAMINATION IS PRESENT IN THE LANDFILL AREA. ALTERNATIVE 2 ESTABLISHES CONTROLS REQUIRED TO PREVENT SOME CHANGES FROM

BASELINE USING DEED RESTRICTIONS AND A SECURITY FENCE. NO CAP RESTORATION IS RECOMMENDED ON ALTERNATIVE 2 LEAVING THE POSSIBILITY OPEN FOR FURTHER LANDFILL CAP DETERIORATION. THIS COULD ALLOW MORE INFILTRATION OF WATER INTO THE LANDFILL RESULTING IN INCREASED LEACHATE FORMATION. ALTERNATIVE 3 REMOVES A SUSPECTED MAJOR CONTRIBUTOR OF CONTAMINATION IN THE POND AND GROUNDWATER (SUBMERGED POND DEBRIS) AND IMPLEMENTS DEED RESTRICTIONS AND ELIMINATES SITE ACCESS TO MAINTAIN IMPROVEMENTS. THE LONG TERM EFFECTIVENESS AND PERMANENCE WOULD BE SUFFICIENT TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT. THIS IS SIMILAR TO ALTERNATIVE 4 EXCEPT THAT THE EFFECTIVENESS AND PERMANENCE INCREASES DUE TO ADDITIONAL REMOVAL. ALTERNATIVE 5 WILL REMOVE ALL ON-SITE CONTAMINATION AND WILL PROVIDE THE GREATEST LONG-TERM EFFECTIVENESS AND PERMANENCE.

SHORT-TERM EFFECTIVENESS

ALL OF THE ALTERNATIVES WITH THE EXCEPTION OF THE ALTERNATIVE 1 WOULD IMMEDIATELY ELIMINATE THE TWO EXPOSURE PATHWAYS: INGESTION OF SURFACE WATER AND INGESTION OF POND FISH. ALTERNATIVE 2 WILL OFFER NO CHANGES IN RISKS FROM BASELINE CONDITIONS, THEREFORE, UNACCEPTABLE RISKS (SUCH AS CONTINUED LEACHING OF METALS INTO THE POND, INCREASING INFILTRATION THROUGH THE LANDFILL CAP AND SITE ACCESS) WILL STILL EXIST. ALTERNATIVE

3 WILL HAVE REASONABLE SHORT-TERM EFFECTIVENESS CONCERNING THE QUARRY POND (REMOVAL OF SUBMERGED DEBRIS), UPGRADING OF THE DETERIORATING LANDFILL CAP, AND THE PREVIOUSLY MENTIONED EXPOSURE PATHWAY ELIMINATIONS. ALTERNATIVE 4 WILL RESULT IN SIGNIFICANT RISK ASSOCIATED IN LEACHATE GENERATION, REMEDIAL WORKER EXPOSURES AND ACCIDENTS, TRAFFIC ACCIDENTS, AND SEDIMENT SUSPENSION IN THE AQUATIC ENVIRONMENT. ALTERNATIVE 5 WILL BE IDENTICAL IN THIS RESPECT TO ALTERNATIVE 4 EXCEPT, POND SEDIMENT WILL BE REMOVED INSTEAD OF BEING COVERED. SHORT-TERM CONSEQUENCES FOR ALTERNATIVES 4 AND 5 MAY BE CATASTROPHIC FOR THE AQUATIC COMMUNITY OF THE QUARRY POND AND HAVE SIGNIFICANT RISKS IN THE SHORT-TERM.

IMPLEMENTABILITY

THE IMPLEMENTABILITY OF AN ALTERNATIVE IS BASED ON TECHNICAL FEASIBILITY, ADMINISTRATIVE FEASIBILITY AND AVAILABILITY OF SERVICES AND MATERIALS. ALL OF THE ALTERNATIVES ARE READILY IMPLEMENTABLE. ALTERNATIVES 1 AND 2 THAT CONSIST OF NO ACTION OR MINOR APPLICATION OF INSTITUTIONAL CONTROLS WILL NOT HAVE ANY IMPLEMENTATION PROBLEMS. FOR ALTERNATIVES 3,4, AND 5 THERE WILL BE LITTLE OR NO IMPLEMENTATION DIFFICULTIES SINCE ONLY STANDARD CONSTRUCTION TECHNIQUES WILL BE UTILIZED. THE ONLY ITEM OF CONCERN WILL BE THE RESOLUTION OF SITE OWNERSHIP ISSUES AS NEEDED FOR THE CONSTRUCTION OF THE SECURITY FENCE AND THE REMOVAL OF DEBRIS FROM THE POND.

COST

ALTERNATIVE 1 CONTAINS ONLY THE COST FOR WELL MONITORING AND HAS A

PRESENT WORTH VALUE OF $133,082. THE PRESENT WORTH VALUE REPRESENTS THE TOTAL COST OF THE REMEDIATION EXPRESSED IN TODAY'S DOLLARS. THE ESTIMATED PRESENT WORTH COST FOR ALTERNATIVE 2 IS $176,000 - $193,000. ALTERNATIVE 3 (MODIFIED) HAS A PRESENT WORTH COST OF $791,512 - $1,189,741 WHILE ALTERNATIVE 4 HAS A PRESENT WORTH COST OF $43,000,000 - $ 100,000,000, AND ALTERNATIVE 5 AT $47,000,000 - $104,000,000. ALTERNATIVES 4 AND 5 ARE NOT COST EFFECTIVE FOR PRESENT SITE CONDITIONS SINCE CONTAMINANT CONCENTRATIONS DO NOT WARRANT EXTENSIVE EXCAVATIONS AT THE SITE, AND LITTLE ADDITIONAL PROTECTION WOULD BE ACHIEVED OVER ALTERNATIVE 3.

STATE ACCEPTANCE

THE STATE OF TENNESSEE HAS ASSISTED EPA IN THE REVIEW OF REPORTS AND SITE EVALUATIONS. THE STATE HAS REVIEWED THE RECORD OF DECISION AND SUBMITTED THEIR APPROVAL FOR THE SELECTED REMEDY AT THE LEWISBURG DUMP SITE.

COMMUNITY ACCEPTANCE

COMMUNITY RESPONSE TO THE ALTERNATIVES IS PRESENTED IN THE RESPONSIVENESS SUMMARY (SECTION 14.0) WHICH ADDRESSES COMMENTS RECEIVED

DURING THE PUBLIC MEETING AND THE PUBLIC COMMENT PERIOD.

#SR
SELECTED REMEDY

THE SELECTED REMEDY FOR THE LEWISBURG DUMP SITE IS MODIFIED ALTERNATIVE 3 INVOLVING SITE ACCESS RESTRICTIONS, DEED RESTRICTIONS, REPLACEMENT OF THE TEST-PIT CAPS WITH LANDFILL CAP MATERIAL, REGRADING THE LANDFILL CAP, REMOVAL OF SITE SURFACE DEBRIS, REMOVAL OF SUBMERGED DEBRIS IN THE QUARRY POND, AND LONG-TERM MONITORING AND ANALYSIS.

THE SELECTED REMEDY WILL INCLUDE THE FOLLOWING ACTIVITIES:

1) IMPLEMENTATION OF INSTITUTIONAL CONTROLS WHICH INCLUDE A SECURITY FENCE AND DEED RESTRICTIONS;

2) REMOVAL OF ALL SITE SURFACE DEBRIS AND DISPOSAL IN EITHER: 1) ONE OF THE TEST-PITS AT THE SITE, 2) AN APPROVED SANITARY LANDFILL, AND 3) A HAZARDOUS WASTE LANDFILL;

3) REMOVAL OF THE DEBRIS IN THE QUARRY POND AND DISPOSAL IN OF THE 3 LOCATIONS DESCRIBED ABOVE;

4) REPLACEMENT OF THE PLASTIC TEST-PIT CAPS WITH LANDFILL CAP MATERIAL;

5) REGRADING THE LANDFILL CAP TO STABILIZE CONDITIONS AND TO

MEET STATE AND FEDERAL REGULATIONS;

6) LONG-TERM WELL MONITORING AND ANALYSIS;

7) LANDFILL CAP RE-SEEDING AND MAINTENANCE.

THE EXTENT OF THE SECURITY FENCE AT THE SITE IS PRESENTED IN FIGURE 13. ESTIMATED COSTS FOR THE REMEDIAL PROCEDURES ARE SHOWN IN TABLE 36.

THE IMPLEMENTATION OF THE REMEDIAL MEASURES FOR THE SELECTED REMEDY WILL TAKE A MAXIMUM OF 3 MONTHS. HOWEVER, IN ORDER TO FULLY DETERMINE THAT THE REMEDIAL ACTIONS TAKEN HAVE EFFECTIVELY REDUCED THE THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT, A 5 YEAR WELL MONITORING AND ANALYSIS PROGRAM WILL BE IMPLEMENTED. MODIFIED ALTERNATIVE 3 CAN BE READILY IMPLEMENTED AND HAS THE LOWEST DEGREE OF SHORT-TERM IMPACT THAT EMPLOYS BOTH INSTITUTIONAL CONTROLS AND ACTIVELY REMOVES A LIKELY SOURCE OF CONTAMINATION. THIS COST OF IMPLEMENTING THIS ALTERNATIVE RANGES FROM $791,512 - $1,189,741 WHICH IS APPROXIMATELY 56 TIMES LESS THAN ALTERNATIVES 4 OR 5 THAT WILL HAVE DEVASTATING SHORT-TERM IMPACTS FOR THE SITE (ESPECIALLY ON THE AQUATIC LIFE IN THE POND).

SUMMARY OF STATUTORY FINDINGS

UNDER ITS LEGAL AUTHORITIES, EPA'S PRIMARY RESPONSIBILITY AT SUPERFUND SITES IS TO UNDERTAKE REMEDIAL ACTIONS THAT ACHIEVE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. IN ADDITION, SECTION 121 OF CERCLA ESTABLISHES SEVERAL OTHER STATUTORY REQUIREMENTS AND PREFERENCES. THESE SPECIFY THAT WHEN COMPLETE, THE SELECTED REMEDIAL ACTION FOR THIS SITE MUST COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE ENVIRONMENTAL STANDARDS ESTABLISHED UNDER FEDERAL AND STATE ENVIRONMENTAL LAWS UNLESS A STATUTORY WAIVER IS IS JUSTIFIED. THE SELECTED REMEDY ALSO MUST BE COST EFFECTIVE AND UTILIZE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. FINALLY, THE STATUTE INCLUDES A PREFERENCE FOR VOLUME, TOXICITY, OR MOBILITY REDUCTION OF HAZARDOUS WASTES AS THEIR PRINCIPAL ELEMENT. THE FOLLOWING SECTIONS DISCUSS HOW THE SELECTED REMEDY MEETS THESE STATUTORY REQUIREMENTS.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

MODIFIED ALTERNATIVE 3 WILL PREVENT HUMAN OR ANIMAL EXPOSURE TO ON-SITE CONTAMINANTS THROUGH THE IMPLEMENTATION OF INSTITUTIONAL CONTROLS, LANDFILL CAP RESTORATION, REMOVAL OF SURFACE DEBRIS AND SUBMERGED DEBRIS IN THE QUARRY POND, WELL MONITORING AND SITE MAINTENANCE. THE CONTAMINANTS WILL BE CONTAINED SO THAT PLANT AND ANIMAL LIFE WILL NO LONGER COME IN CONTACT WITH AND BIOACCUMULATE THE CONTAMINATION. THE CANCER RISK ASSOCIATED WITH THE SITE WILL BE AROUND 1X10-6 AND THE HAZARD INDICES (HI) WILL BE LESS THAN 1.0.

THERE WILL BE NO UNACCEPTABLE SHORT-TERM THREATS OR CROSS MEDIA IMPACTS ASSOCIATED WITH THE SELECTED REMEDIES THAT CANNOT BE READILY CONTROLLED SINCE ONLY MINIMAL CONTACT WITH OR MOVEMENT OF THE WASTES WILL OCCUR.

COMPLIANCE WITH ARARS

THE SELECTED REMEDY WILL COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). THE ACTION SPECIFIC, CHEMICAL SPECIFIC, AND LOCATION SPECIFIC ARARS ARE PRESENTED BELOW:

ACTION SPECIFIC:

* STATE OF TENNESSEE SOLID WASTE PROCESSING AND DISPOSAL FACILITIES IN TENNESSEE (TCA68-13-1 ET. SEQ., RULE 1200-1-7)

* STATE OF TENNESSEE SOLID WASTE PROCESSING AND DISPOSAL FACILITIES IN TENNESSEE (RULE 1200-1-7.01 THROUGH .07)

* OCCUPATIONAL SAFETY AND HEALTH ACT (29 USC 651,29 CFR1904,1910, AND 1926)

* RESOURCE CONSERVATION AND RECOVERY ACT (42 USC 6901, ET.SEQ., 40CFR264.

CHEMICAL SPECIFIC:

* SAFE DRINKING WATER ACT (42 USC 300F, ET. SEQ.)

* CLEAN WATER ACT (404, & 33 USC 1313, ET. SEQ.)

LOCATION SPECIFIC ARARS:

NONE

RCRA LAND DISPOSAL RESTRICTIONS (LDRS) ARE NOT APPLICABLE SINCE THE REMEDIAL ACTIVITIES CONCERNING THE LANDFILL CAP WILL NOT REQUIRE ANY MOVEMENT OF CONTAMINATED MATERIALS. HOWEVER, IF DURING THE REMOVAL OF DEBRIS FROM THE POND HAZARDOUS WASTE IS ENCOUNTERED, IT WILL BE MANAGED IN ACCORDANCE WITH RCRA REQUIREMENTS INCLUDING LDRS.

#TA

TABLE 36
COST ESTIMATE AND
DESCRIPTION OF MODIFIED ALTERNATIVE 3

TASK	DISPOSAL OPTIONS OPTION 1A	OPTION 2B	OPTION 3C

		TOTAL CAPITAL COSTS:	
DEED RESTRICTIONS	$9,130	$9,130	$9,130
SECURITY FENCE	$117,815	$117,815	$117,815
SUBMERGED DEBRIS REMOVAL	$299,199	$462,189	$371,025
TEST-PIT CAP REMEDIATION	$22,221	$22,221	$22,221
SURFACE DERIS REMOVAL	$73,085	$308,243	$58,126
		PRESENT WORTH O&M COSTS:	
DEED RESTRICTIONS	$57,493	$57,493	$57,493
GROUNDWATER MONITORING	$133,082	$133,082	$133,082
SURFACE WATER			

MONITORING	$79,567	$79,567	$79,567
ESTIMATED COST OF MODIFIED ALTERNATIVE 3:	$791,512	$1,189,741	$848,459

A) IMPLEMENTATION OF DISPOSAL OPTION 1 INCLUDES DISPOSAL OF SUBMERGED AND SURFCE DEBRIS TO AN APORVED OFFSITE SANITARY LANDFILL

B) IMPLEMENTATION OF DISPOSAL OPTION 2 INCLUDES DISPOSAL OF SUBMERGED AND SURFACE DEBRIS TO AN APPOVED HAZARDOUS WASTE LANDFILL

C) IMPLEMENTANTION OF DISPOSAL OPTION 3 INCLUDES DISPOSAL OF SUBMERGED AND SURFACE DEBEIS IN ONE OF THE 12 TEST-PITS LOCATED ON-SITE (WITHIN THE 4-A LANDFILL)

MAINTENANCE ACTIVITIES FOR THE SELECTED REMEDY WILL INCLUDE:

1) PERIODIC INSPECTION OF THE SECURITY FENCE (CONDUCTED SEMI-ANNUALLY);

2) PERIODIC INSPECTION OF THE LANDFILL CAP (CONDUCTED SEMI-ANNUALLY);

3) MOWING OF THE LANDFILL CAP (4 TIMES A YEAR);

4) RE-ESTABLISHMENT OF VEGETATION OVER DISTRESSED AREAS;

5) PERIODIC REPAIR OF AREAS ERODED BY SURFACE WATER RUNOFF.

MONITORING ACTIVITIES FOR THE SELECTED REMEDY WILL INCLUDE:

1) INITIAL STUDY UTILIZING A DYE-TRACER ANALYSIS TO DETERMINE PREFERRED WELL MONITORING/SAMPLING LOCATIONS;

2) PERIODIC SAMPLING AND ANALYSIS OF GROUNDWATER FROM THE PREFERRED WELL MONITORING LOCATIONS;

3) PERIODIC SAMPLING AND ANALYSIS OF THE SURFICIAL WATERS FROM THE QUARRY POND;

4) PERIODIC SAMPLING AND ANALYSIS OF THE FISH FROM THE QUARRY POND.

THE REMEDIAL ACTIVITIES FOR THE SITE WILL EFFECTIVELY REDUCE THE LEVELS OF CONTAMINATION TO EFFECTIVELY MEET THE CLEANUP LEVELS FOR CONTAMINANTS OF CONCERN ARE PRESENTED IN TABLE 37. STABILIZING THE LANDFILL CAP WILL BE FUNDAMENTALLY IMPORTANT SO THAT POTENTIAL FOR INCREASING FLOW THROUGH THE CONTAMINATED MATERIAL IS REDUCED. THIS WILL INTERN REDUCE THE AMOUNT OF CONTAMINANTS SUCH AS COPPER AND DEHP THAT ARE ENTERING THE GROUNDWATER, QUARRY POND, AND POND SEDIMENT FROM THE LANDFILL.

TABLE 37
GROUNDWATER CRITERIA FOR LEWISBURG DUMP SITE

CHEMICAL	GROUNDWATER CRITERIA (UG/L)	BASIS
ORGANICS		
ACETONE	700	RFD
2-BUTANONE	350	RFD
BIS(2-ETHYLHEXYL) PHTHALATE	4	PMCL
CARBON DISULFIDE	700	RFD
METHYLENE CHLORIDE	5	PMCL
4-METHYL-2-PENTANONE	350	RFD
INORGANICS		
ALUMINUM	50	PSMCL
BARIUM	1000	MCL
CADMIUM	10	MCLA
CHROMIUM	50	MCL
COPPER	1000	SMCL
IRON	300	SMCL
LEAD	15	IAL
MANGANESE	50	SMCL

MERCURY	2	MCL
NICKEL	100	MCLG
SILVER	50	MCL
ZINC	5000	SMCL

A) PROPOSED MCL IS 5.

RFD = REFERENCE DOSE. CRITERIA IS BASED ON THE LIFETIME INGESTION OF 2 LITERS OF WATER BY A 70 KG INDIVIDUAL. THIS NUMBER ALLOWS A 20 PERCENT RELATIVE SOURCE CONTRIBUTION BY THE SITE GROUNDWATER ROUTE.

MCL = MAXIMUM CONTAMINANT LEVEL

PMCL = PROPOSED MCL

PSMCL = PROPOSED SECONDARY MCL

MCLG = MAXIMUM CONTAMINANT LEVEL GOAL. NCP STATES THAT NON-ZERO MCLGS SHOULD BE USED AS CRITERIA. IF THE MCLG IS ZERO, THE MCL IS USED.

TABLE 37 CONT'D

IAL = INTERIM ACTION LEVEL. THE INTERIM ACTION LEVEL FOR LEAD WAS

RECOMMENDED IN A MEMORANDUM FROM HENRY LONGEST (DIRECTOR OF THE OFFICE OF EMERGENCY AND REMEDIAL RESPONSE) TO PATRICK TOBIN (DIRECTOR, REGION IV WASTE MANAGEMENT DIVISION), JUNE 21, 1990.

GUIDANCE TO BE CONSIDERED (TBCS)

* REFERENCE DOSES (RFDS) FROM THE EPA OFFICE OF RESEARCH AND DEVELOPMENT

* CARCINOGENIC POTENCY FACTORS (CPFS) FROM THE EPA ENVIRONMENTAL CRITERIA AND ASSESSMENT OFFICE, EPA CARCINOGEN ASSESSMENT GROUP

* SMCLS UNDER THE SAFE DRINKING WATER ACT (42 USC 300F, ET. SEQ.)

* PROPOSED NATIONAL PRIMARY AND SECONDARY DRINKING WATER REGULATIONS OF MAY 22, 1990 (54FR22062)

* STATE OF TENNESSEE SOLID WASTE PROCESSING AND DISPOSAL FACILITIES IN TENNESSEE (TCA 68-13-1 ET. SEQ., RULE 1200-1-7)

COST EFFECTIVENESS

THE SELECTED REMEDY IS COST EFFECTIVE BECAUSE IT HAS BEEN DETERMINED TO PROVIDE OVERALL EFFECTIVENESS PROPORTIONAL TO ITS COSTS. THE SELECTED REMEDY IS THE LEAST COSTLY OF ALTERNATIVE 3,4 AND 5 WHICH ARE EQUALLY PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT

TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

US EPA AND THE STATE OF TENNESSEE BELIEVE THE SELECTED REMEDY REPRESENTS THE MAXIMUM EXTENT TO WHICH PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES CAN BE UTILIZED IN A COST EFFECTIVE MANNER FOR THE FINAL REMEDY AT THE LEWISBURG DUMP SITE. OF THE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLY WITH ARARS, US EPA AND THE STATE HAVE DETERMINED THAT THE SELECTED REMEDY PROVIDES THE BEST BALANCE OF TRADEOFFS IN TERMS OF LONG-TERM EFFECTIVENESS AND PERMANENCE, REDUCTION IN TOXICITY, MOBILITY OR VOLUME ACHIEVED THROUGH TREATMENT, SHORT-TERM EFFECTIVENESS, IMPLEMENTABILITY, AND COST (ALSO CONSIDERING THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT AND CONSIDERING STATE AND COMMUNITY ACCEPTANCE).

THE SELECTED REMEDY FOR THE CONTAINMENT OF THE DUMP WASTES CAN BE IMPLEMENTED AND COMPLETED QUICKLY WITH LESS DIFFICULTY, AND AT LESS COST THAN TREATMENT TECHNOLOGIES DUE TO THE LOW LEVELS OF CONTAMINATION PRESENT AT THE SITE. ALSO, THE SITE CONTAMINANTS ARE DISSEMINATED THROUGHOUT THE LANDFILL MAKING EXCAVATION AND TREATMENT OF SPECIFIC CONTAMINANTS SUCH AS DEHP AND COPPER UNREALISTIC GIVEN THE LARGE AMOUNT OF MATERIALS (126,025 CUBIC YARDS).

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

IN SELECTING THE REMEDY FOR THE LEWISBURG DUMP SITE, EPA CONSIDERED THE USE OF TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT POSSIBLE. AS STATED PREVIOUSLY, DUE TO UNREALISTIC COSTS AND IMPLEMENTATION PROBLEMS FOR TREATMENT, IT NOT CONSIDERED AS AN EFFECTIVE OPTION FOR THE SITE. HOWEVER, AS COMPARED TO TREATMENT, THERE WOULD BE NO SIGNIFICANT CHANGES IN RISK LEVELS IF CONTAINMENT IS IMPLEMENTED.

#RS

RESPONSIVENESS SUMMARY

A RESPONSIVENESS SUMMARY IS REQUIRED BY SUPERFUND POLICY TO PROVIDE A SUMMARY OF CITIZEN COMMENTS AND CONCERNS ABOUT THE SITE, AS RAISED DURING THE PUBLIC COMMENT PERIOD, AND THE RESPONSES TO THOSE CONCERNS. ALL COMMENTS SUMMARIZED IN THIS DOCUMENT HAVE BEEN FACTORED INTO THE FINAL DECISION OF THE PREFERRED ALTERNATIVE FOR CLEANUP OF THE LEWISBURG DUMP SITE.

THIS RESPONSIVENESS SUMMARY FOR THE LEWISBURG DUMP SITE IS DIVIDED INTO THE FOLLOWING SECTIONS:

I. OVERVIEW: THIS SECTION DISCUSSES THE RECOMMENDED ALTERNATIVE FOR REMEDIAL ACTION AND THE PUBLIC REACTION TO THIS ALTERNATIVE.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS: THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY INTEREST AND CONCERNS REGARDING THE LEWISBURG DUMP SITE.

III. SUMMARY OF MAJOR QUESTIONS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSES: THIS SECTION PRESENTS BOTH ORAL AND WRITTEN COMMENTS SUBMITTED DURING THE PUBLIC COMMENT PERIOD, AND PROVIDES RESPONSES TO THESE COMMENTS.

IV. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPAS RESPONSES TO THESE COMMENTS: THIS SECTION CONTAINS A SUMMARY OF THE ONE LETTER RECEIVED BY EPA CONTAINING WRITTEN COMMENTS, AS WELL AS EPAS WRITTEN RESPONSE LETTER, AND RESPONSE TO WRITTEN COMMENTS SUBMITTED ON BEHALF OF LERC.

APPENDIX A: CONTAINS THE PROPOSED PLAN THAT WAS PRESENTED TO THE PUBLIC ON JULY 25, 1990. THIS DOCUMENT WAS ALSO PLACED IN THE INFORMATION REPOSITORY AND MAILED TO THOSE ON THE MAILING LIST.

APPENDIX B: INCLUDES THE SIGN IN SHEETS FROM THE PUBLIC MEETING HELD ON JULY 25, 1990 AT THE CITY ADMINISTRATION BUILDING IN LEWISBURG,

TENNESSEE.

APPENDIX C: INCLUDES THE NAME, ADDRESS AND PHONE NUMBER OF THE INFORMATION REPOSITORY DESIGNATED FOR THE LEWISBURG DUMP SITE.

APPENDIX D: CONTAINS THE OFFICIAL TRANSCRIPT OF THE PUBLIC HEARING ON THE PROPOSED PLAN FOR THE REMEDIAL ACTIVITIES FOR THE LEWISBURG DUMP SITE IN LEWISBURG, TENNESSEE.

(I) OVERVIEW

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA) AND THE TENNESSEE DEPARTMENT OF HEALTH AND THE ENVIRONMENT (TDHE) ESTABLISHED A PUBLIC COMMENT PERIOD FROM JULY 25TH TO AUGUST 23, 1990 FOR INTERESTED PARTIES TO COMMENT ON EPA'S PROPOSED PLAN (APPENDIX A) FOR THE REMEDIAL ACTIVITIES AT THE LEWISBURG DUMP SITE. A PUBLIC MEETING WAS CONDUCTED BY EPA ON WEDNESDAY, JULY 25, 1990 AT THE CITY ADMINISTRATION BUILDING IN LEWISBURG, TENNESSEE. THE MEETING SUMMARIZED RECENT RI/FS STUDIES CONDUCTED AT THE SITE AND PRESENTED EPA'S PREFERRED ALTERNATIVE IN THE PROPOSED PLAN WHICH CONTAINS THE FOLLOWING SECTIONS:

* INTRODUCTION
* SITE BACKGROUND
* SCOPE AND ROLE OF RESPONSE ACTION
* SUMMARY OF SITE RISKS
* SUMMARY OF ALTERNATIVES
* THE COMMUNITY'S ROLE IN THE SELECTION PROCESS

* LIST OF CONTACTS
* GLOSSARY OF EVALUATION CRITERIA
* GLOSSARY OF TERMS

THE PREFERRED REMEDIAL ALTERNATIVE (ALTERNATIVE 3) PRESENTED AT THE PUBLIC MEETING HELD ON JULY 25, 1990 CONSISTS OF:

* IMPLEMENTATION OF INSTITUTIONAL CONTROLS WHICH INCLUDE A SECURITY FENCE AND DEED RESTRICTIONS;

* REMOVAL OF ALL SITE SURFACE DEBRIS AND APPROPRIATE DISPOSAL IN EITHER: 1) ONE OF THE TEST-PITS AT THE SITE, 2) AN APPROVED SANITARY LANDFILL, AND/OR 3) A HAZARDOUS WASTE LANDFILL;

* REMOVAL OF THE DEBRIS IN THE QUARRY POND AND DISPOSAL IN ONE OF THE 3 LOCATIONS DESCRIBED ABOVE;

* REPLACEMENT OF THE PLASTIC TEST-PIT CAPS WITH LANDFILL CAP MATERIAL;

* REGRADING THE LANDFILL CAP TO STABILIZE CONDITIONS AND TO

MEET STATE AND FEDERAL REGULATIONS;

* LONG-TERM WELL MONITORING AND ANALYSIS;

* LANDFILL CAP RE-SEEDING AND MAINTENANCE.

A COMPLETE DISCUSSION OF THE PREFERRED ALTERNATIVE IS PRESENTED IN SECTION 13. OVERALL, THE COMMUNITY FAVORS THE SELECTION OF THE RECOMMENDED ALTERNATIVE - ALTERNATIVE 3. HOWEVER, DUE TO SEVERAL CONCERNS RAISED DURING THE PUBLIC MEETING AND IN THE COMMENTS TO EPA'S PROPOSED PLAN SUBMITTED TO THE EPA ON BEHALF OF THE LEWISBURG ENVIRONMENTAL RESPONSE COMMITTEE (PRPS), THE RECOMMENDED ALTERNATIVE HAS BEEN MODIFIED AS FOLLOWS: 1) LANDFILL CAP "REGRADING", IS STATED INSTEAD OF "UPGRADING", 2) REGRADING OF THE CAP WILL PREVENT ADDITIONAL INFILTRATION OF WATER DUE TO LANDFILL CAP UNDULATION - WHICH WILL MEET STATE AND FEDERAL REQUIREMENTS WITHOUT CAP "UPGRADING", AND 3) THREE OPTIONS ARE PRESENTED FOR DISPOSAL OF SUBMERGED POND DEBRIS WHICH CHANGE THE COST RANGE AND ESTIMATES FOR ALTERNATIVE 3 (MODIFIED).

BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS

THE COMMUNITY OF LEWISBURG HAS HAD RELATIVELY FEW COMMENTS SINCE THE LEWISBURG DUMP SITE CAME UNDER SCRUTINY IN THE EARLY 1970'S BY THE STATE OF TENNESSEE DEPARTMENT OF HEALTH AND THE ENVIRONMENT. OF THE TWO PUBLIC MEETINGS HELD AT THE CITY OF LEWISBURG (AUGUST 11, 1988 AND JULY 25, 1990), THE MEETING ON JULY 25, 1990 RECORDED THE MOST RESPONSE TO THE RECENT ACTIVITIES OF THE SUPERFUND PROCESS. BY FAR, THE MAJORITY OF THE RESPONSE AT THIS PUBLIC MEETING WAS BY POTENTIALLY RESPONSIBLE

PARTIES (PRPS). ALSO TO RESPOND (WITH THE EXCEPTION OF THE PUBLIC MEETING) WAS THE LEWISBURG ENVIRONMENTAL RESPONSE COMMITTEE (LERC) WHICH WAS FORMED IN MAY 1987 TO NEGOTIATE WITH EPA FOR UNDERTAKING A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS). A COMPLETE SUMMARY OF THESE RESPONSES IS CONTAINED IN SECTION 14.3.

SUMMARY OF MAJOR QUESTIONS AND COMMENTS DURING THE PUBLIC MEETING AND THE PUBLIC COMMENT PERIOD, AND EPA'S RESPONSES TO THESE QUESTIONS

THIS SECTION SUMMARIZES MAJOR QUESTIONS AND COMMENTS THAT THE EPA RECEIVED DURING THE PUBLIC MEETING AND DURING THE PUBLIC COMMENT PERIOD. THE VAST MAJORITY OF QUESTIONS WERE RECORDED DURING THE PUBLIC MEETING AND ARE CONTAINED IN THEIR ENTIRETY IN THE MEETING MINUTES/OFFICIAL TRANSCRIPT (APPENDIX D).

COMMENT:

A PRP WANTED TO KNOW HOW THE EPA GOES ABOUT IDENTIFYING PRPS (I.E.- WHAT IS THE PROCESS?)

RESPONSE:

IDENTIFYING PRPS IS A CONTINUOUS PROCESS THAT CAN VARY FROM SITE TO SITE. A POTENTIALLY RESPONSIBLE PARTY (PRP) UNDER THE CERCLA STATUTE IS ANYONE WHO OWNED OR OPERATED THE SITE, AS WELL AS ANYONE WHO GENERATED OR TRANSPORTED WASTE DISPOSED OF AT THE SITE. AN ATTEMPT IS MADE TO GATHER WHATEVER INFORMATION THAT CAN BE OBTAINED. IN THIS CASE, THE STATE SENT OUT SOME QUESTIONNAIRES ON POTENTIAL GENERATORS AT THE SITE. THE EPA REVIEWED THE INFORMATION AND SENT OUT INFORMATION REQUEST LETTERS ASKING THE PRPS IF THEY HAVE ANY RECORDS OF WASTE DISPOSAL AT THE SITE.

COMMENT:

A PRP QUESTIONED IF AN INDIVIDUAL OR COMPANY RECEIVES A PRP LETTER, AND THEY SUPPLY INFORMATION TO INDICATE THAT THERE IS NO WAY POSSIBLE THAT THEY COULD HAVE BEEN A PRP, WHAT'S THE PROCESS OF NOT BEING A PRP ANYMORE?

RESPONSE:

EPA COMPILES THE LIST OF PRPS AND IF YOUR NAME REMAINS ON THE LIST, WE FEEL THAT WE HAVE SOME EVIDENCE THAT MAKES YOU A PRP. IF WE DO NOT HAVE ENOUGH EVIDENCE TO ELIMINATE A PRP FROM THE LIST OR IF WE HAVE NOT MADE THE DECISION (AT THIS TIME) FOR A VARIETY OF REASONS, THE PRP REMAINS ON THE LIST. ALL COMPANIES (PRPS) ON THE LIST HAVE RECEIVED NOTICE LETTERS AT THIS TIME TO GIVE PRPS A CHANCE TO PARTICIPATE IN THE PROCESS.

COMMENT:

A PRP WAS INTERESTED IN KNOWING HYPOTHETICALLY, IF THEY WOULD RECEIVE CORRESPONDENCE FROM THE EPA INFORMING THEM THAT THEY WERE ELIMINATED AS A PRP (WOULD A LETTER BE FORTHCOMING?).

RESPONSE:

IT'S IS GENERALLY, NOT AGENCY POLICY, HOWEVER, IF CIRCUMSTANCES INDICATE THAT WITH CERTAINTY THAT THE INDIVIDUAL OR COMPANY IS NOT A PRP, THEN SUCH A LETTER COULD BE GIVEN.

COMMENT:

A PRP INDICATED THAT IF ONCE AN INDIVIDUAL OR COMPANY IS A PRP, THEN THEY MAY BE A PRP UNTIL THEY ARE DEAD, AND THEN MAYBE THEIR ANCESTORS WILL STILL BE PRPS.

RESPONSE:

IF THE POTENTIAL LIABILITY REMAINS, YES.

COMMENT:

A PRP QUESTIONED THE REASONING BEHIND TRANSPORTING THE SUBMERGED POND DEBRIS TO A SANITARY LANDFILL WHEN IT COULD BE BURIED AT THE SITE.

RESPONSE:

EPA STATED THAT IF IT IS MORE REASONABLE TO BURY IT AT THE SITE AND WE CAN DO SO WITH THE LEAST POSSIBLE COMPLICATION, BY THE REGULATIONS, THEN IT IS A VIABLE OPTION. IT APPEARS, HOWEVER, THAT HAULING THE MATERIAL SOMEWHERE ELSE SEEMS AT THIS POINT TO BE THE LEAST DISRUPTIVE OPTION.

COMMENT:

A PRP QUESTIONED THE EPAS JUSTIFICATION FOR REMOVING ANYTHING SINCE THEY BELIEVE IT HAS NOT BEEN DETERMINED THAT THERE IS ANY HAZARD TO THE HEALTH AND THE ENVIRONMENT. THEY WANT TO KNOW WHAT IS THE NECESSITY OF REMOVING ANYTHING IF THE LEVELS OF CONTAMINANT AREN'T SUCH THAT THEY POSE A PROBLEM?

RESPONSE:

THE LEVELS OF CONTAMINATION ARE NOT, ACROSS THE BOARD, SIGNIFICANTLY HIGH, BUT WE DO HAVE TWO CONTAMINANTS OF CONCERN OUT THERE, AND ONE OF THEM IS COPPER, AND THE TOXICITY OF COPPER IS HIGH. AND WE DO HAVE COPPER IN THE POND. THE SECOND CONTAMINANT OF CONCERN IS DEHP, AND IT IS FOUND AT THE SITE FREQUENTLY. IT IS A COMPONENT USED IN PLASTICS AND HAS REASONABLY LOW LEVELS OF MAXIMUM CONTAMINANT LEVELS FOR DRINKING WATER STANDARDS. DEHP IS FOUND IN THE TEST-PITS (38,000 PPB), MONITORING WELLS, AND POND SEDIMENTS. IT IS IMPORTANT THAT WE IMPLEMENT

THE SITE ACCESS RESTRICTIONS, AND DO REMOVE THE MATERIALS OUT OF THAT POND. IF WE ARE GOING TO MONITOR THE SITE AND TRY TO INSURE THAT IT IS CLEANED UP WE NEED TO GET THOSE TWO CONTAMINANTS OF CONCERN DOWN TO REASONABLE LEVELS (MUST BE EVALUATED OVER A LONG PERIOD OF TIME). EPA IS CONCERNED THAT THE SITE WILL CONTINUE TO FURTHER DETERIORATE, ESPECIALLY THE LANDFILL CAP. PRESENTLY THE CAP IS PENETRATED BY SOME SMALL TREES AND VARIOUS OTHER PLANTS, AND IT IS UNDULATING SO THAT WATER CAN ACTUALLY POND ON THE TOP, AND IT IS GETTING INTO THE LANDFILL, TO CAUSE FURTHER DETERIORATION. THAT IS A CONCERN AT THIS TIME. THE SITE MAY NOT BE THE WORST IN THE NATION, BUT IT CERTAINLY HAS THE POTENTIAL TO CONTINUE TO DETERIORATE, AND THE EPA WANTS TO TRY TO ELIMINATE THAT POSSIBILITY.

COMMENT:

A PRP WONDERED IF THERE WAS ANY RECORD OF ANY HEALTH PROBLEMS WITHIN THE COMMUNITY, BECAUSE OF THE SITE.

RESPONSE:

ATSDR CONDUCTS AN INDEPENDENT EVALUATION OF BASICALLY, THE RI DATA TO SEE IF, BASED ON THE DATA, THERE WARRANTS A FULL-BLOWN HEALTH STUDY OR

ASSESSMENT. THEY HAVE REVIEWED THE DATA AND BELIEVE THAT THE DATA PRESENTED INDICATES THAT THIS SITE DOES NOT REQUIRE THAT KIND OF IN-DEPTH STUDY.

COMMENT:

A PRP WAS WONDERING WHERE THE DEHP COULD HAVE COME FROM?

RESPONSE:

THE EPA DOES NOT HAVE A DEFINITE, PIN-POINT SOURCE FOR DEHP IN THE LEWISBURG DUMP SITE AT THIS POINT. HOWEVER, DEHP CAN BE LEACHED OUT OF COMMONLY FOUND HOUSEHOLD WASTE SUCH AS PLASTIC CONTAINERS, ETC.

COMMENT:

A PRP MENTIONED THAT THEY WERE AS CONCERNED ABOUT THE ENVIRONMENT AND PEOPLE'S HEALTH AS ANYONE ELSE. THEY DID NOT FEEL THAT THE THEY NEED TO SPEND A MILLION DOLLARS TO TAKE CARE OF THIS SITE, BASED ON THE INFORMATION THAT HAS BEEN PRESENTED.

RESPONSE:

THE EPA STRUGGLES WITH THESE KIND OF CONCERNS FREQUENTLY. THE EPA RECOGNIZES THAT THE SITE IS NOT THE WORST IN THE COUNTRY, HOWEVER, WE DO RECOGNIZE SEVERAL CONCERNS AT THE SITE THAT DO NEED TO BE ADDRESSED. WE ARE BEING CONSERVATIVE. WE BELIEVE THAT IT IS BETTER TO BE CAUTIOUS AND GO AHEAD AND STABILIZE THE SITE AND DO THE REMEDIAL STEPS NOW, RATHER

THAN TAKE THAT CHANCE THAT IT MIGHT GET WORSE.

COMMENT:

A PRP COMMENTED THAT ELMER AKIN (EPA - RISK ASSESSMENT) MENTIONED THE PLASTIC FOUND IS IN NORMAL HOUSEHOLD DISPOSAL. IT LOOKS LIKE EVERY RESIDENT OF LEWISBURG SHOULD BE ON THE PRP LIST BECAUSE WE ALL PUT PLASTIC IN THERE, INSTEAD OF JUST A FEW SELECTED COMPANIES LIKE MYSELF AND A FEW OTHERS IN HERE.

RESPONSE:

THE CITY OF LEWISBURG IS A POTENTIALLY RESPONSIBLE PARTY, AS BEING THE OWNER-OPERATOR OF THE SITE. SO, IN A WAY, EVERYBODY IN LEWISBURG MAY PAY THROUGH THE CITY'S RESPONSIBILITIES AS BEING THE OWNER AND OPERATOR OF THE SITE.

COMMENT:

A CITIZEN WANTED TO KNOW WHAT THE APPLICABLE AND RELEVANT REQUIREMENTS WERE FOR THE SITE. IN SOME OF THE ALTERNATIVES, IT WAS MENTIONED THAT SOME OF THE ALTERNATIVES DO NOT MEET THOSE (ARARS) AND SOME DO. DOES IT

RELATE TO HAVING TO PUT A PARTICULAR TYPE OF CLAY CAP ON THE SITE THAT MEETS THE ARAR OR A BUNCH OF ARARS, WHAT ARE THEY?

RESPONSE:

ARARS ARE SOME FAIRLY STANDARD FEDERAL AND STATE REQUIREMENTS. ONE REQUIREMENT THAT WAS MENTIONED SEVERAL TIMES WAS THE STATE LANDFILL REQUIREMENTS FOR THE CLOSURE OF SANITARY LANDFILLS. THIS LANDFILL WAS CLOSED A NUMBER OF YEARS AGO AND THERE WERE STANDARDS IN PLACE FOR CLOSURE OF LANDFILLS AT THAT TIME (MEANING THE LANDFILL WAS TO MEET THE STATE AND FEDERAL REQUIREMENTS AT THE TIME IT WAS CLOSED). WE ARE SAYING THAT WE NEED TO REVIEW THE PRESENT CONDITION OF THAT CAP AND SEE WHAT MEASURES NEED TO BE UPGRADED, IF ANY, TO BRING THAT CAP BACK INTO STANDARDS WITH THE STATE LANDFILL. WE HAVE ALSO IDENTIFIED SOME WATER QUALITY CRITERIA FOR COPPER, AS A STATE ARAR, AND THAT IS BASICALLY A STANDARD THAT IS SET FOR FRESH WATER AQUATIC LIFE. IT IS A STANDARD THAT EPA THINKS IS PROTECTIVE OF THE FISH AND ECOSYSTEMS. WE HAVE ALSO LOOKED AT THE ARARS FOR GROUNDWATER, SPECIFICALLY THE MAXIMUM CONTAMINANT LIMITS. THE CLEAN WATER ACT ALSO HAS REQUIREMENTS (FOR DREDGING AND FILLING THE WATERS OF THE UNITED STATES) THAT MUST BE MET CONCERNING THE QUARRY POND.

COMMENT:

A PRP STATED, "IT WOULD SEEM SIMPLER TO ME, RATHER THAN WORRY ABOUT CLEAN WATER IN THAT POND, OR KEEPING IT CLEAN, TO FILL IT UP, PUT A LID ON IT, AND IT'S GONE. YOU DON'T HAVE TO WORRY ABOUT IT. PUT THE FISH IN ANOTHER POND".

RESPONSE:

SOME PEOPLE OR SOME COMMENTORS HAVE ALREADY BASICALLY SUGGESTED THAT. AND IT WARRANTS LOOKING INTO. CLOSING OR SEALING THE POND CERTAINLY IS A POSSIBILITY. HOWEVER, IT MAY ADD MORE COST. IF YOU ACTUALLY WANT TO RELOCATE THE FISH, FILL UP THAT TWO-ACRE HOLE, AND FILL IT IN, IT WILL GET FAIRLY EXPENSIVE. THE EXISTING AQUATIC COMMUNITY APPEARS HEALTHY AND WITH AN ESTABLISHED ECOSYSTEM, IT MAY ACTUALLY BE BENEFICIAL TO LEAVE THAT (THE POND) IN PLACE, AND WORK TO HELP PREVENT ANY TYPE OF CHANGES OUT AT THE SITE THAT COULD RESULT IN CHANGES IN THE ENVIRONMENT.

COMMENT:

A CITIZEN WONDERED IF THE INTERMITTENT STREAM THAT RUNS ABOVE THE QUARRY POND CAN FLUSH THE POLLUTANTS OUT OF THE POND DURING WET WEATHER.

RESPONSE:

IT IS DIFFICULT TO QUANTIFY WHETHER THAT WOULD BE ENOUGH WATER TO ACTUALLY FLUSH THE POND. THE MOST SIGNIFICANT SOURCE OF WATER FOR THE POND APPEARS TO BE THE GROUNDWATER, NOT THE INTERMITTENT STREAM (BECAUSE

A 24 HOUR PUMP TEST CONDUCTED DURING DRY CONDITIONS RECORDED NOT CHANGE IN WATER LEVEL FOR THE POND).

COMMENT:

A CITIZEN WANTED TO KNOW IF IT WAS SAFE TO DRINK THE WATER IN THE SURROUNDING AREA (WITHIN APPROXIMATELY 200 YARDS; THE CITIZEN INDICATED THAT THERE WERE GOOD PLACES AT SOME SINKHOLES TO DRINK THE WATER).

RESPONSE:

THERE IS QUITE A LOT OF GARBAGE IN THE SINKHOLES NEAR THE SITE (GIVEN THE AMOUNT OF GARBAGE IN THE SINKHOLES, IT WOULD NOT BE GOOD TO DRINK FROM THEM). THE STUDY DOES NOT LOOK AT BACTERIAL CONTAMINATION OF THE WELLS SO WE REALLY CAN NOT CALL THE WATER SAFE EVEN IF WE FOUND NO CONTAMINANTS.

COMMENT:

A CITIZEN INQUIRED ABOUT CONTAMINATION OR GROUNDWATER FLOW TO THE WEST OR EAST OF THE SITE.

RESPONSE:

IT APPEARS THAT FROM THE PREVIOUS REMEDIAL INVESTIGATIONS THAT HAVE BEEN CONDUCTED THAT THE WATER FLOWS TO THE EAST OR SOUTHEAST. THEN THE WATER TAKES A LOCAL DEVIATION ONCE IT GETS OUT OF THE POND, POSSIBLY TO THE SOUTHEAST. WE DO NOT KNOW EXACTLY, BECAUSE THE AQUIFER IS VERY COMPLEX.

ONE THING WE KNOW FOR SURE IS THAT THE WATER EVENTUALLY HEADS TOWARD BIG ROCK CREEK. WE BELIEVE THE OVERALL DIRECTION OF GROUNDWATER FLOW IS TO THE EAST-SOUTHEAST.

COMMENT:

ACCORDING TO THE EPA AND THE STATE OF TENNESSEE, THIS IS ONE OF THE 200 MOST DANGEROUS SITES IN THE COUNTRY, RIGHT?

RESPONSE:

NO. THERE ARE CURRENTLY OVER 1000 SITES ON THE NPL.

COMMENT:

A CITIZEN INQUIRED - IF WE HAD THESE TEST RESULTS IN 1986, WOULD THE SITE HAVE BEEN PLACED ON THE NPL?

RESPONSE:

THAT IS A QUESTION THAT REALLY DOES NOT HAVE AN ANSWER. SITES ARE PLACED ON THE NPL UNIFORMLY, WITHOUT THIS KIND OF INFORMATION. THAT IS

THE WHOLE REASON FOR PUTTING THEM ON, SO THAT YOU WILL FIND OUT WHICH SITES ARE THE BIG PROBLEM, WHICH SITES ARE A LITTLE PROBLEM, AND WHICH SITES ARE NO PROBLEM.

COMMENT:

THE PRP CONTRACTOR WANTED TO KNOW HOW THE LIST OF SIGNIFICANT CONTAMINANTS WAS DETERMINED?

RESPONSE:

THE EPA THOUGHT IT WAS IMPORTANT FOR THE PUBLIC TO KNOW THE WHOLE RANGE OF COMPOUNDS IDENTIFIED IN SEVERAL STUDIES. THE TERM, "SIGNIFICANT CONTAMINANTS" HAS DIFFERENT APPLICATIONS IN THE

PROPOSED PLAN AS COMPARED TO THE RISK ASSESSMENT.

COMMENT:

A PRP WANTED TO KNOW WHAT THE LEVELS OF DEHP AND COPPER ARE IN OTHER LANDFILLS. THEY BELIEVE THAT THESE ARE STRICTLY HOUSEHOLD BY-PRODUCTS AND THINK WE SHOULD NOT BE SPENDING 1-2 MILLION DOLLARS TO CLEANUP HOUSEHOLD WASTE.

RESPONSE:

WE HAVE IDENTIFIED HAZARDOUS SUBSTANCES AT THE SITE. THIS COMBINED WITH THE COMPLEXITY OF THE KARST AQUIFER AND THE RECEPTORS IS WHY LEWISBURG

WAS IDENTIFIED AS A SITE EARLY ON. WE CAN NOT SAY ANYTHING ABOUT OTHER SITES IN COMPARISON TO LEWISBURG SINCE EACH BEEN EVALUATED INDEPENDENTLY.

COMMENT:

A PRP ASKED WHY LEWISBURG HAS TO SPEND THE MONEY TO CLEANUP THEIR SITE WHILE OTHER TOWNS WITH A SANITARY LANDFILL DO NOT?

RESPONSE:

THE STATE OF TENNESSEE RECOMMENDED THE LEWISBURG DUMP FOR THE NPL. THESE OTHER TOWNS MAY EVENTUALLY HAVE THEIR SITES LISTED IF CONDITIONS WARRANT IT.

COMMENT:

A CITIZEN WONDERS WHY WE NEED TO CLEAN THE SITE UP IF THERE APPEARS TO BE NO DAMAGE TO THE ECOSYSTEM AND WE DO NOT HAVE A DEGREE OF A SITUATION THAT WOULD WARRANT FURTHER REMEDIAL ACTION?

RESPONSE:

THERE IS ENOUGH INFORMATION CONCERNING THE LEVELS OF CONTAMINATION AT THE SITE TO WARRANT REMEDIAL ACTIVITIES. THIS PLAN WE HAVE PUT FORTH TO YOU TONIGHT IS BASED ON ALL OF THE INPUT WE HAVE RECEIVED. WE BELIEVE THAT THE PLAN IS ADEQUATE, CONSERVATIVE, AND DEALS WITH THE PROBLEMS AT THE SITE.

COMMENT:

HAS A DYE-TEST BEEN RUN TO TELL WHETHER THE POND IS LEAKING OR NOT?

RESPONSE:

THERE HAS NOT BEEN A DYE-TRACER DONE.

COMMENT:

A CITIZEN MENTIONED THAT THEY WOULD NOT LIKE TO SEE ALTERNATIVE 1 SELECTED (NO ACTION). THEY WOULD LIKE TO HAVE AN OPTION BETWEEN ONE AND THREE, WITH MONITORING AND INSTITUTIONAL CONTROLS, BUT POSSIBLY WITH LESS EMPHASIS ON THE CAP AND SUBMERGED DEBRIS REMOVAL.

RESPONSE:

ONE OF THE REASONS THAT WE ARE CHOOSING ALTERNATIVE 3 OR PROPOSING ALTERNATIVE 3, IS AGAIN, TO MEET STATE AND FEDERAL REQUIREMENTS. THERE IS SOME CONTAMINATION IN THE POND, NOW, THAT IS ABOVE SOME OF THE STATE AND FEDERAL STATUTES. THERE ARE HAZARDOUS CONSTITUENTS IN THE LANDFILL,

AND THERE IS A CAP WITH, RIGHT NOW, 13 TEST-PITS THAT HAVE BEEN DUG INTO IT, AND THERE IS ONLY PVC OR A THIN LAYER COVERING THE CAP. WE ALSO NEED TO INSURE THAT THE CAP DRAINS PROPERLY, AND WE MUST REMOVE THE TREES THAT MAY PENETRATE THE CAP.

ADDITIONAL COMMENTS ON BEHALF OF THE LEWISBURG ENVIRONMENTAL RESPONSE COMMITTEE (LERC):

COMMENT:

UPGRADING THE ENTIRE LANDFILL CAP TO MEET THE CURRENT STATE OF TENNESSEE LANDFILL CAP REQUIREMENTS WILL BE BOTH EXPENSIVE AND POTENTIALLY HARMFUL TO THE ENVIRONMENT. THE ESTIMATED COST FOR THIS EFFORT IS APPROXIMATELY $400,000. EXTENSIVE CAP UPGRADING EFFORTS COULD HAVE A DELETERIOUS IMPACT ON THE DELICATE BIOLOGICAL SYSTEM THAT EXISTS WITHIN THE LANDFILL. THE ALTERATION OF THIS SYSTEM COULD RESULT IN THE SUDDEN DEVELOPMENT OF A HARMFUL LEACHATE PLUME WHICH WOULD BE VERY DIFFICULT TO CONTAIN DUE TO THE HYDROLOGIC SETTING OF THE SITE AND THE LOCATION WITHIN THE FRACTURED LIMESTONE QUARRY.

RESPONSE:

THE SELECTED REMEDY FOR THE SITE {ALTERNATIVE 3 (MODIFIED)} PROPOSES TO "REGRADE", NOT TO "UPGRADE" THE LANDFILL CAP. THE CAP IS IN REASONABLY GOOD CONDITION CONSIDERING IT IS ALMOST 12 YEARS OLD. HOWEVER, IN ORDER TO PREVENT ADDITIONAL CAP DETERIORATION AS WELL AS ADDITIONAL INFILTRATION OF WATER, THE VEGETATION (INCLUDING SMALL TREES) WILL HAVE TO BE REMOVED AND THE PRESENTLY UNDULATING CAP REGRADED. THIS WILL BE A REASONABLY CONSERVATIVE AND LESS COSTLY APPROACH THAT WILL MEET THE STATE AND FEDERAL REQUIREMENTS AT THE TIME OF LANDFILL CLOSURE. THE BEFORE MENTIONED PROBLEMS WITH THE CAP ARE ALLOWING WATER TO INFILTRATE AT INCREASING RATES WHICH POTENTIALLY COULD CREATE A HARMFUL LEACHATE PLUME. WE FEEL THAT THIS APPROACH TO CAP REMEDIATION WILL SERVE TO PREVENT A LEACHATE PLUME FROM DEVELOPING.

COMMENT:

THE AUGUST 8, 1990 MONTHLY REPORT SHOWED THAT THE COPPER LEVEL IN THE POND (18.4 PPB) IS BELOW THE AQUATIC-BASED CLEANUP LEVEL (19.7 PPB). SINCE THE COPPER LEVEL IN THE POND IS NOT AS GREAT OF CONCERN AS IT ORIGINALLY APPEARED TO BE, IT SEEMS APPROPRIATE TO REDUCE THE EFFORT ASSOCIATED WITH DEBRIS REMOVAL FROM THE POND.

RESPONSE:

THE WATER HARDNESS SAMPLE WAS OBTAINED WITHOUT EPA NOTIFICATION (EPA NOTIFICATION IS REQUIRED BY THE ADMINISTRATIVE ORDER) OR OVERSIGHT IN JULY (1990) AND THE RESULTING ANALYSIS (IN A REPORT DATED AUGUST 8, 1990) REVEALED A WATER HARDNESS OF 182 MG/L CA CO3. IN THE RI A VALUE OF 100 MG/L CACO3 WAS ASSUMED TO CALCULATE THE AQUATIC BASED POND WATER

CLEANUP LEVELS FOR COPPER, LEAD, NICKEL AND ZINC. THE DIFFERENT HARDNESS VALUES CAN BE ATTRIBUTED TO A VARIETY OF FACTORS WHICH INCLUDE: SEASONAL FLUCTUATION IN RAINFALL AMOUNTS AND FREQUENCY, THE ABILITY AND LENGTH OF TIME FOR THE QUARRY POND TO EQUILIBRATE AFTER RAINFALL EVENTS, SIZE OF THE POND, FLOW INTO AND OUT OF THE POND, GEOLOGIC FACTORS, AND OTHERS. GIVEN THAT ONLY ONE VARIABLE HAS BEEN ANALYZED, IT APPEARS THAT THE RESULTING CHANGES IN THE POND WATER CLEANUP VALUES, ARE INCONCLUSIVE. THE VERY SMALL SAMPLING EFFORT CAN NOT BE CONSIDERED SINCE IT HAS NOT BEEN DETERMINED WHETHER OR NOT THE SAMPLE IS REPRESENTATIVE OF THE AVERAGE HARDNESS VALUE FOR THE QUARRY POND. THUS, THE ORIGINAL VALUES PRESENTED IN THE RI WILL BE UTILIZED.

ANOTHER REASON FOR THE AGENCY TO RELY ON THE APPROVED RI DATA IS THAT THE DATA ACQUISITION PERFORMED IN JULY 1990 WAS DONE WITHOUT EPA NOTIFICATION OR OVERSIGHT AND CAN NOT BE CONSIDERED AS PART OF THE RI DATA OR RESULTS.

EVEN IF THE NEW DATA WAS ACCEPTABLE, THE COPPER VALUES ARE STILL NOT CONSIDERED TO BE IN THE ACCEPTABLE RISK RANGE AND THE CLEANUP LEVEL IN THE RI (12 PPB) WILL BE UTILIZED. SINCE COPPER IN AQUATIC SYSTEMS CAN BE HIGHLY TOXIC, IT WILL BE NECESSARY TO REDUCE THE AMOUNT OF THIS METAL IN THE POND. MODIFICATIONS TO ALTERNATIVE 3 MOST LIKELY WILL NOT

INCLUDE ANY SIGNIFICANT REDUCTION OF SUBMERGED POND DEBRIS REMOVAL SINCE THIS IS NOT ONLY ONE OF THE LIKELY SOURCES OF CONTAMINATION (BESIDES THE LANDFILL CONSTITUENTS) BUT ALSO THE MOST OBVIOUS.

WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPAS RESPONSES TO THESE COMMENTS.

THIS SECTION CONTAINS A SUMMARY OF THE ONE LETTER RECEIVED BY EPA CONTAINING WRITTEN COMMENTS, AS WELL AS EPAS RESPONSE LETTER.

SUMMARY: A CITIZEN ASKS, WHY AFTER ALL OF THESE YEARS DO YOU GO BACK TO THE PEOPLE WHO USED IT (THE LANDFILL, WITH PERMISSION) AND MAKE THEM CLEAN IT UP? IF ANYONE SHOULD CLEAN IT UP IT SHOULD BE THE CITY OF LEWISBURG. WHERE WAS THE ENVIRONMENTAL PROTECTION AGENCY WHEN THIS DUMP STARTED?

#TA

TABLE 32
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN

CHEMICAL	GROUNDWATER (UG/L)	SURFACE WATER (UG/L)	SEDIMENTS (MG/KG)	FISH (MG/KG)
ORGANICS				
ACETONE	---	---	0.033 - 7	0.51 - 13

2-BUTANONE	---	---	0.007 - 0.018	---
CARBON DISULFIDE	---	---	0.004 - 0.007	0.14 - 0.48
DEHP	12	---	1.4 - 25	---
METHYLENE CHLORIDE	---	---	0.01 - 0.12	---
4-METHYL 2-PENTANONE	---	---	0.023 - 1.6	---
INORGANICS				
ALUMINUM	43 - 15,900	105 - 134	8,300 - 32,300	35 - 102
BARIUM	4 - 698	136 - 165	143 - 244	5 - 7
CADMIUM	---	---	1 - 13	6

CHROMIUM	---	---	15 - 70	---
COPPER	12 - 120	13 - 35	10 - 157	8 - 10
IRON	45 - 25,800	320 - 880	17,300 - 116,000	511 - 576
LEAD	---	---	26 - 116	2
MANGANESE	3 - 745	98 - 161	701 - 1,490	558 - 1,280
MERCURY	---	---	0.07 - 0.55	5
NICKEL	---	32 - 41	16 - 34	12
SILVER	---	---	14 - 24	---
ZINC	---	21 - 70	56 - 1,580	72 - 213

TABLE 33
SUMMARY OF CHEMICAL CONCENTRATION VALUES AT RECEPTOR LOCATIONS

CHEMICAL	GROUNDWATERA (UG/L)	SURFACE WATERB (UG/L)	FISH INGESTIONC (MG/KG)
ORGANICS			
ACETONE	---	---	13

CARBON DISULFIDE	---	---	0.48
INORGANICS			
ALUMINUM	10,068	107	102
BARIUM	594	158	7
CADMIUM	---	---	6
COPPER	81	27	10
LEAD	---	---	2
IRON	25,857	783	576
MANGANESE	749	157	5
NICKEL	---	39	12
ZINC	---	62	213

A) THESE VALUES REPRESENT THE UPPER 95 PERCENT CONFIDENCE LIMIT ON THE ARITHMETIC MEAN OF SITE-INFLUENCED GROUNDWATER CONCENTRATIONS. SEDIMENT DATA ARE NOT INCLUDED ON THIS TABLE SINCE NO EXPOSURE PATHWAY TO SEDIMENTS EXISTS.

B) THESE VALUES REPRESENT THE UPPER 95 PERCENT CONFIDENCE LIMIT ON THE GEOMETRIC MEAN OF ALL SURFACE WATER SAMPLES. THE GEOMETRIC MEAN WAS USED BECAUSE OF THE SKEWED NATURE OF THE DATA.

C) SINCE ONLY TWO SAMPLES WERE AVAILABLE, THESE VALUES REPRESENT THE MAXIMUM CONCENTRATION VALUE FOUND IN FISH FILLET SAMPLES.

TABLE 34
PARAMETERS USED TO DESCRIBE EXPOSURE TO SITE-RELATED CHEMICALS OF POTENTIAL CONCERN

EXPOSURE	CHEMICAL CONCEN. IN MEDIA	EXPOSURE PATHWAY ASSUMPTIONS
DRINKING WATER	UPPER 95 PERCENT BOUND ON ARITHMETIC MEAN	IR = 2 1/DAY EF = 365 DAYS/YEAR ED = 70 YEARS BW = 70 KG AT = 25,550 DAYS
MEAT INGESTION	UPPER 95 PERCENT BOUND ON ARITHMETIC MEAN	WIRC= 50 1/DAY FF= CHEMICAL SPECIFIC IR = 0.103 KG/DAY FI = 0.75 EF = 260 DAYS/YEAR ED = 70 YEARS BW = 70 KG AT = 25,550 DAYS
INCIDENTAL	UPPER 95 PERCENT BOUND ON	CR = 50 ML/HOUR

INGESTION WHILE SWIMMING	ARITHMETIC MEAN	ET = 2.6 HOURS/EVENT EF = 48 EVENTS/YEAR ED = 8 YEARS BW = 49.5 KG (14 YR. MALE) AT = 2,920 DAYS
FISH INGESTION	MAXIMUM CONCENTRATION	IR = 0.284 KG/MEAL FI = 0.10 EF = 48 DAYS/YEAR ED = 70 YEARS BW = 70 KG AT = 25,550 DAYS

WHERE:

IR = INGESTION RATE
EF = EXPOSURE FREQUENCY
ED = EXPOSURE DURATION
BW = BODY WEIGHT
AT = AVERAGE TIME
WIRC = WATER INGESTION RATE FOR COW
FF = INGESTION-TO-BEEF TRANSFER COEFFICIENT

FI = FRACTION INGESTED FROM CONTAMINATED SOURCE
CR = CONTACT RATE
ET = EXPOSURE TIME

TABLE 35
TOXICITY VALUES FOR CHEMICALS OF POTENTIAL CONCERN

CHEMICAL	CANCER POTENCY FACTOR (CPF) MG/KG-DAY)-1	REFERENCE DOSE (RFD) (MG/KG-DAY)-1	SOURCE
ACETONE	---	0.1	IRIS
2-BUTANONE	---	0.05	HEAST
BIS(2-ETHYLHEXYL) PHTHALATE	0.014	0.02	IRIS
CARBON DISULFIDE	---	0.1	IRIS
METHYLENE CHLORIDE	0.0075	0.06	IRIS
4-METHYL-2-PENTANONE	---	0.05	IRIS
ALUMINUMA	---	---	
BARIUM	---	0.05	HEAST
CADMIUM	---	0.0005	IRIS

CHROMIUM	---	---	
COPPER(A)	---	---	
LEAD(A)	---	---	
MANGANESE	---	0.2	HEAST
MERCURY	---	0.0003	HEAST
NICKEL	---	0.02	IRIS
SILVER	---	0.003	IRIS
ZINC	---	0.2	HEAST

A) THERE ARE NO AGENCY VERIFIED ORAL TOXICITY VALUES FOR THESE CHEMICALS

IRIS = INTEGRATED RISK INFORMATION SYSTEM

HEAST = HEALTH EFFECTS ASSESSMENT SUMMARY TABLES